SVAN 979

Sound & Vibration

ANALYSER

USER'S MANUAL

SVANTEK Sp. z o.o.
WARSAW, October 2010

Notice: *This user's manual presents the software revision named 1.17 (cf. the description of the* ***Unit Label*** *position of the* ***Instrument*** *list). The succeeding software revisions (marked with the bigger numbers) can slightly change the view of some displays presented in the text of the manual.*

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1. INTRODUCTION

The **SVAN 979** is digital, Type 1 Sound & Vibration level meter as well as 1/1 or 1/3 octave analyser. The instrument is designed for general acoustic and vibration measurements, environmental monitoring, occupational health and safety monitoring.

Three acoustic or vibration profiles allow parallel measurements with independently defined filters and RMS detector time constants. Each profile provides significant number of results (like **Leq**, **LMax**, **LMin**, **LPeak**, **Spl**, **SEL** in the case of sound measurements or **RMS**, **Peak**, **VDV**, **MTVV** in the case of vibration measurements). Advanced time history logging for each profile provides complete information about measured signal in the external SD-card or USB Memory Stick and can be easy downloaded to any PC using the USB interface and SvanPC+ software.

All required weighting filters (e.g.: **A**, **B**, **C**, **G**, **Z** in the case of sound measurements and **Wh** in case of vibration measurements) including the latest ISO 2631-1&2 standard are available with this instrument. The general Vibration measurements (like acceleration, velocity and displacement) and HVM meeting ISO 8041:2005 standard are possible. The RMQ detector enables direct measurement of the Vibration Dose Value (**VDV**).

Using computational power of its digital signal processor the **SVAN 979** instrument can, simultaneously to the meter mode, perform real time **1/1 Octave** or **1/3 Octave** analysis including the calculations of the statistical levels. Following functions are also available as options: FFT analysis, acoustic Loudness measurements, Tonality analysis, reverberation time (RT60) measurements, Enveloping analysis, AEM measurements and user programmable second order band pass filters. The time history logging of 1/1 Octave, 1/3 Octave and FFT analysis is also provided. The time domain signal recording on the external SD-card or USB memory stick is available. Advanced trigger and alarm functions are available in the standard version of this, currently the most sophisticated, one channel instrument from Svantek.

Fast USB 1.1 interface (12 MHz) creates real time link for the PC "front-end" application of the **SVAN 979** instrument. The **Host USB** functionality is also available. The USB Host controller installed in the instrument enables the user to connect to this meter the USB memory sticks, USB hard disks, USB printers etc. A PC using the optional interfaces (RS 232, Bluetooth or IrDA) can also remotely control the instrument. The measurement results can be downloaded to PC using all mentioned above interfaces. The instrument is powered from four AA standard or rechargeable batteries (i.e. NiMH - separate charger is required). The powering of the instrument from the External DC power source or the USB interface is also provided. Robust and lightweight design accomplishes the exceptional features of this new generation instrument.

1.1. SVAN 979 as Sound Level Meter & Analyser

- noise measurements (**SPL**, **LEQ**, **SEL**, **Lden**, **Ltm3**, **Ltm5** and statistics) with Type 1 IEC 61672:2002 accuracy in the frequency range 3.15 Hz ÷ 20 kHz with GRAS 40AE microphone
- parallel **Impulse**, **Fast** and **Slow** detectors for the measurements with **A**, **B**, **C**, **G**, **Z** filters
- two measurement ranges 22 dB RMS(A) ÷ 123 dB Peak (**Low**) and 30 dB RMS(A) ÷ 140 dB Peak (**High**)
- **1/1 Octave** and **1/3 Octave** real time analysis - 15 filters with centre frequencies 1 Hz ÷16 kHz, Type 1 – IEC 1260 and 45 filters with centre frequencies 0.8 Hz ÷ 20 kHz, Type 1 – IEC 1260

1.2. SVAN 979 as Vibration Meter & Analyser

- General Vibration measurements (acceleration, velocity and displacement) and optionally HVM meeting ISO 8041:2005 and ISO 10816-1 standards in the frequency range depends on the

parameters of the attached accelerometer, i.e. with DYTRAN 3185D general purpose transducer is equal to 2Hz ÷ 20 kHz

- parallel **RMS**, **VDV**, **MTVV** or **Max**, **Peak**, **Peak–Peak** measurements
- **Z**, **HP1**, **HP3**, **HP10**, **Wh** weighting filters
- **1/1 Octave** and **1/3 Octave** real time analysis - 15 filters with centre frequencies 1 Hz ÷16 kHz, Type 1 – IEC 1260 and 45 filters with centre frequencies 0.8 Hz ÷ 20 kHz, Type 1 – IEC 1260

1.3. General features of SVAN 979

- Advanced **Data Logger** including spectra's logging on the **SD-card** or **USB Memory Stick** providing almost unlimited logging capacity
- domain signal recording (option)
- Advanced trigger and alarm functions
- **USB 1.1 Host & Client interface** (real time PC "front end" application supported)
- **RS 232** and **Bluetooth** interface
- Integration time programmable up to **24 h**
- Power supply by **four AA** rechargeable or standard batteries
- Hand held, light weight and robust case
- Easy in use

1.4. Accessories included

- **GRAS 40AE -** prepolarised ½" microphone with nominal sensitivity 50 mV/Pa
- **SV 17** - microphone preamplifier
- **SC 16 -** USB 1.1 cable
- **SC 59 -** I/O cable
- **four AA** batteries
- **SvanPC+** for windows 2000/XP software

1.5. Accessories available

- **SA 17A** - external battery pack
- **SA 22** - windscreen
- **SA 143** - carrying case for SVAN 95x and accessories
- **SA 79** - carrying case for SVAN 9xx and accessories (waterproof)
- **SA 46** - carrying belt-bag for SVAN 94x and SVAN 95x (leather)
- **SA 47** - carrying bag for SVAN 95x and accessories (fabric material)
- **SV 55** - RS 232 option for the SVAN 955

1.6. Software options available

- **SVAN979 -** SVAN 979 including 1/1 and 1/3 octave analysis
- **SV 979_4 -** FFT analysis option for the SVAN 979
- **SV 979_5 -** RT60 option for the SVAN 979
- **SV 979_6 -** Tonality analysis option for the SVAN 979
- **SV 979_7 -** Loudness analysis option for the SVAN 979
- **SV 979_8 -** Rotation measurement option including Laser Tachometer (RPM)
- **SV 979_11 -** Enveloping analysis option
- **SV 979_12 -** Balancing (RPM option required) *
- **SV 979_15 -** domain signal recording (to the USB Flash Disk: *.srt or *.wav format)
- **SV 979_16 -** user programmable second order band pass filters*

Notice: *The software options can be purchased in any time as only the introduction of the special code is required for their activation.*

SVAN 979 instrument with the preamplifier and microphone

2. MANUAL CONTROL OF THE INSTRUMENT

The control of the instrument is developed in the fully dialogue way. The user can operate the instrument by selecting the proper position from the **Menu** list. Thanks to that, the number of the control push-buttons of the instrument is reduced to nine.

2.1 Control push-buttons on the front panel

On the front panel of the instrument, there are located the following control push-buttons:

- **<ENTER>**, **(<Menu>)**, **[<Save>]**,
- **<ESC>**, **(<Cal.>)**, **[<S/P>]**,
- **<Shift>**, [Markers]
- **<Alt>**, [Markers]
- **<▲>**,
- **<◀>**,
- **<▶>**,
- **<▼>**,
- **<Start/Stop>**.

The name given in (...) brackets denotes the second push-button function which is available after pressing it in conjunction (or in sequence) with the **<Shift>** push-button. For the first two push-buttons the name given in square brackets […] denotes also the third push-button function which is available after pressing it in conjunction (or in sequence) with the **<Alt>** push-button.

<Shift>

The second function of a push-button (written in red colour on a push-button) can be used when the **<Shift>** push-button is pressed. This push-button can be used in two different ways:

- as **Shift** in the keyboard (e.g. while typing the filename); both **<Shift>** and the second push-button must be pressed in parallel;
- as **2nd Fun**; this push-button can be pressed and released before pressing the second one or pressed in parallel (while operating in *"**2nd Fun**"* mode, see the following notice) with the second push-button.

The **<Shift>** push-button pressed in conjunction with the **<Alt>** one enables the user to enter the **Markers** on the plots during the measurement.

Notice: *The operation of this push-button can be set as the "**Direct**" mode or the "**2nd Fun**." mode in the **Shift/Alt** position (path: Menu / Instrument / Keyboard Settings) - see description of the **Instrument** list.*

<Alt>

This push-button enables one to choose the third push-button function in case of **[<Save>]** and **[<Pause>]** push-buttons. In order to select the third function the user must press the **<Alt>** and the second push-button simultaneously.

Notice: *The simultaneous pressing of the* ***<Alt>*** *and* ***<Start/Stop>*** *push-buttons switches the instrument on and off.*

<Start/Stop>

This push-button enables one to start the measurement process, when the instrument is not measuring or to stop it, when the instrument is in course of the measurement. It is also possible to set such mode of this push-button, in which in order to start or stop the measurements the user has to press it simultaneously with the **<Shift>** one.

Notice: *The change of the* ***<Start/Stop>*** *push-button mode is performed in the* ***Keyboard Settings*** *window of the* ***Instrument*** *list (see description of the* ***Instrument*** *list).*

<ENTER>

This push-button enables one to enter the selected operation mode or to confirm the control options. Some additional functions of this push-button will be described in the following chapters of this manual.

(<Menu>)

This push-button (pressed together with the **<Shift>** one) enables the user to enter the main list containing six sub-lists: **Function**, **Measurement**, **Display**, **File**, **Instrument**, **Auxiliary Setup** and **Report**. Each of the mentioned above sub-lists consists of the sub-lists, elements and data windows. These main sub-lists will be described in details in the following chapters of the manual. Double pressed **<Menu>** push-button enters the list containing eight last opened sub-lists. It often speeds up the control of the instrument as the user has the faster access to the frequently used sub-lists.

[<Save>]

This push-button (pressed together with the **<Alt>** one) enables the user to save measurement results as a file in the internal instrument's memory or on the SD-card or USB memory stick. There are two available functions: **Save Next** - save a file with the name increased by one (e.g. 02JAN0, 02JAN1, 02JAN3) and **Save** - save a file with the edited name.

<ESC>

This push-button closes the control lists, sub-lists or windows. It acts in opposite to the **<ENTER>** push-button. When the window is closed pressing the **<ESC>** push-button, any changes made in it are ignored in almost all cases.

([Cal.])

This push-button (pressed together with the **<Shift>** one) enters the **Calibration** sub-list in which the user can enter one of the available sub-lists (**Calibr. by Sensitivity**, **Calibr. by Measurement**, **Last Calibration** and **Clear Calibr. History**).

[<S/P>]

This push-button enables one to jump to the **Setup Manager** window or to break the measurement process temporarily.

<◄>, <►>

These push-buttons enable one, in particular, to:

- select the column in a multi column parameter list;
- select the parameters value in an active position (e.g. filter Z, A or C, Integration period: 1s, 2s, 3s, … etc.);
- control the cursor in Spectrum, Logger and Statistics modes of result's presentation;
- select the position of the character in the text edition;
- activate markers 2 and 3
- speed up the changing of the numerical values of the parameters when pressed and hold.

(<◄>, <►>)

The **<◄>**, **<►>** push-buttons pressed in conjunction (or in sequence) with the **<Shift>** enable one, in particular, to:

- select the parameters value in an active position (e.g. filter **Z**, **A** or **C**, Integration period: **1s**, **2s**, **3s**, … etc.);
- zoom in or zoom out in the **Spectrum** presentation mode

Some other possible reactions of the instrument on the pressing of these push-buttons will be described in details in the following chapters.

[<◄>, <►>]

The **<◄>**, **<►>** push-buttons pressed in conjunction (or in sequence) with the **<Alt>** enable one, in particular, to:

- speed up the changing of the numerical values of the parameters (i.e. the step is increased from 1 to 10 in the setting of **Start Delay** - *path: Menu / Input / General Settings / Start Delay*);
- insert or delete a character in the text edition modes.

Some other possible reactions of the instrument on the pressing of these push-buttons will be described in details in the following chapters.

<▲>, <▼>

The **<▲>**, **<▼>** push-buttons enable one, in particular, to:

- select lines in the list;
- select the proper character from the list in the text edition mode;
- activate markers 1 and 4

Some other possible reactions of the instrument on the pressing of these push-buttons will be described in details in the following chapters.

(<▲>, <▼>)

The **<▲>**, **<▼>** push-buttons pressed in conjunction (or in sequence) with the **<Shift>** enable one, in particular, to:

- change the relation between the Y-axis and X-axis of all plots presented on the screen

Some other possible reactions of the instrument on the pressing of these push-buttons will be described in details in the following chapters.

[<▲>, <▼>]

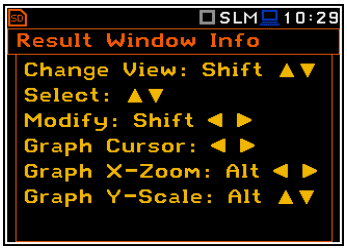
The **<▲>**, **<▼>** push-buttons pressed in conjunction (or in sequence) with the **<Alt>** enable one, in particular, to:

- change the mode of result's presentation;
- programme the Real Clock (**RTC**) and **Timer**;

Some other possible reactions of the instrument on the pressing of these push-buttons will be described in details in the following chapters.

[Info]

The **Info** (simultaneous pressing the **<◄>**, **<►>** push-buttons) opens the window with the help information in the measurement display modes.



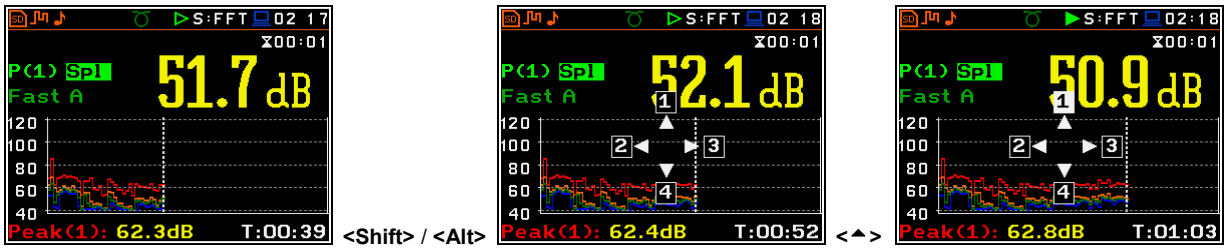
Result Window Info

[Markers]

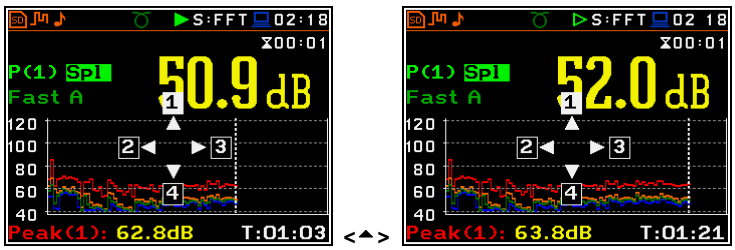
The **Markers** enable the user to mark special events, which occurred during the performed measurements (i.e. the airplane flight, the dog's barking, the train's drive etc.). In order to activate the markers the logger has to be switched on (*path: <Menu> / Measurement / General Settings / Logging / Logger Setup*) and one or more logger results (**Peak**, **Max**, **Min**, **Leq** for sound measurements or **Peak**, **P–P**, **Max**, **RMS** for Vibration measurements) in profiles have to be activated (*path: <Menu> / Measurement / General Settings / Logging / Logger Results*). In order to enter the marker the user must press **<Shift>** and **<Alt>** push-buttons simultaneously during the measurement. Then four available markers appears on the screen. To choose marker number 1 the user must press **<▲>** push button (number 2 - **<◄>**, number - 3 **<►>** and number 4 - **<▼>**).

The markers disappear automatically and chosen marker is activated (after pressing **<Shift>** + **<Alt>** again active marker number will be highlighted). In order to switch off the marker, the user has to pressing **<Shift>** + **<Alt>** and press the arrow push-button, which refers to the marker to be switched off.

The current state of the markers is indicated in the logger's file (cf. App. B for details) and can be used to show them using dedicated presentation software.

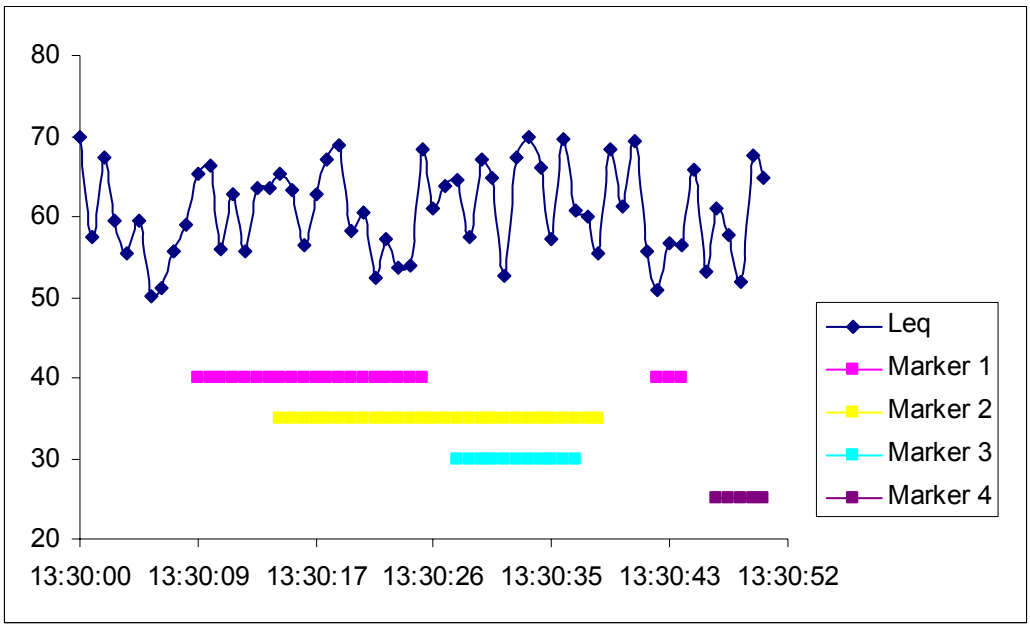


Marker 1 activation



Marker 1 deactivation

The exemplary presentation of the markers on the time history plot is shown below (to view a plot with markers the user has to transfer data to the proper software).



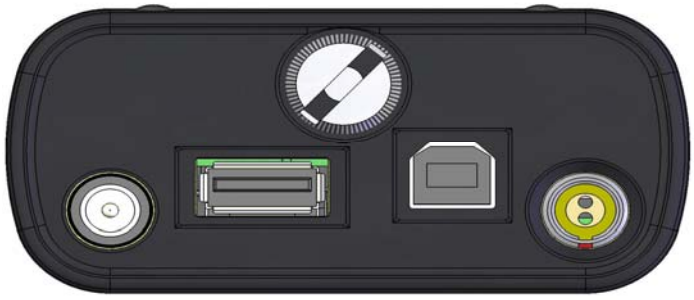
History plot with the indication of the active markers

2.2 Input and output sockets of the instrument

The measurement input, called **Input** is placed in the centre of the instrument's top cover. It is the Lemo-7 socket. The microphone preamplifier **SV 17** has the proper plug in with the screw. The accelerometers have to be connected to the instrument using also the Lemo-7 connector. After plug in the preamplifier or the accelerometer to the measurement input, the screw should be twisted to the light resistance. The full description of the signals connected to the sockets is given in the Appendix C.

Top cover of the SVAN 979 instrument in 1:1 scale

In the bottom cover there are four sockets, placed from the right to the left as follows: **6-24V**, **USB Host**, **USB Device** and **I/O**.



Bottom cover of the SVAN 979 instrument in 1:1 scale

The **USB Device** 1.1 interface is the serial interface working with 12 MHz clock. Thanks to its speed, it is widely used in all PC. In the instrument, the standard 4-pins socket is used described in details in Appendix C.

The **USB Host** interface can be used to connect the external USB Memory Stick or USB hard disk, enabling the device to register virtually infinite sequence of measurement results.

The additional multi purpose input / output socket, called **I/O**, is a two-pins LEMO socket. On this socket, in the case when the Analogue Output functionality is selected, the signal from the input of the analogue / digital converter (before the correction) is available. This signal can be registered using magnetic recorder or observed on the oscilloscope. The Digital Input as another functionality serves as the external trigger, while the Digital Output is used to generate the trigger pulse or alarm pulse from the instrument.

To the **6-24V** socket located on the bottom cover of the instrument, the user can connect the external DC power 6-24V adapter. The current consumption depends on the voltage of the power supplier.

Notice: *Switch the power off before connecting the instrument to any other device (e.g. a printer or a Personal Computer).*

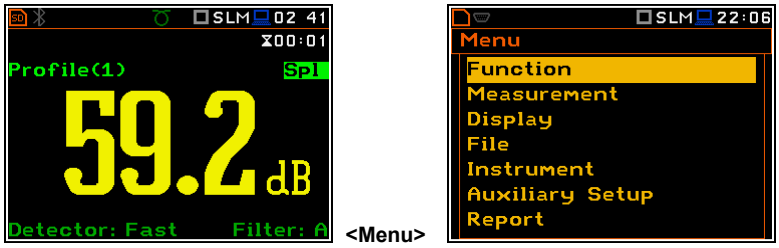
3. SETTING THE INSTRUMENT

In order to perform the measurements using the instrument the user has only to plug-in the preamplifier with the microphone or the proper transducer and to switch the power on.

> ***Notice:*** *The user has to press the* ***<Alt>*** *and* ***<Start/Stop>*** *push-buttons in parallel in order to switch the power On/Off.*

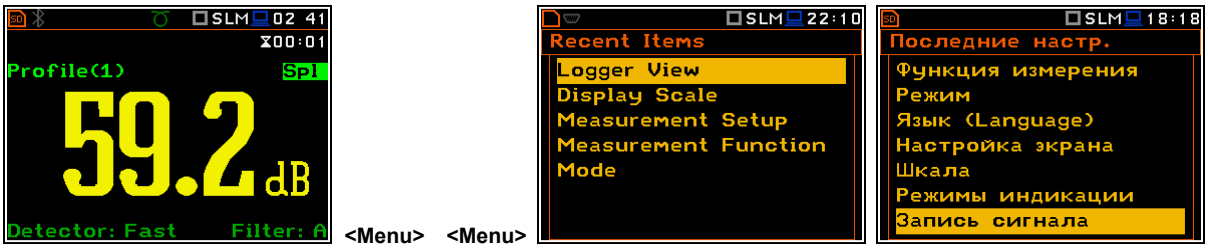
3.1. Basis of the instrument's control

The instrument is controlled by means of nine push-buttons of the keyboard. Using these push-buttons one can access all available functions and change the value of all available parameters. The functions are placed in the system of lists and sub-lists. The main list contains the headers of seven lists, which also contain sub-lists or positions (elements). The main list is opened after pressing the **<Menu>** push-button. This list contains the following lists: **Function**, **Measurement**, **Display**, **File**, **Instrument**, **Auxiliary Setup** and **Report**. The elements of each list are described in details in Chapters 4 ÷ 10. Only one list can be accessed at a time, the one that name is highlighted (displayed inversely). The change of the highlighted line is done after pressing the **<▲>**, **<▼>** push-buttons.



Displays with the main menu

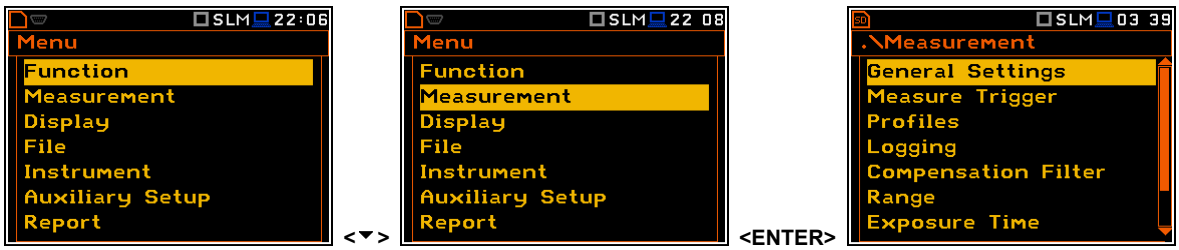
The double pressing of the **<Menu>** push-button opens the list of recently accessed menu items. Such solution enables one to access the most frequently used lists quickly, without the necessity of passing the whole path.



Display with the recently accessed menu items (after double pressing of the <Menu> push-button)

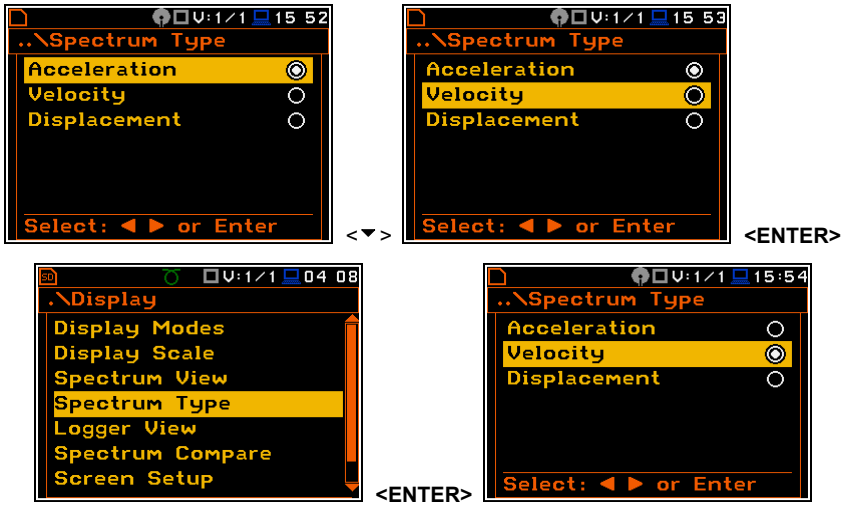
The instrument's menu consists of different type of windows, which may be: main menu list, sub-menu list, option list, parameter list, text editor window, information window and file manager window with file command list. All windows and control options are described just below, exception is the file manager window, which is described in chapter 7 (description of menu **File**).

After the selection of the desired list with the use of **<▲>** or **<▼>** push-buttons, the user has to press the **<ENTER>** push-button in order to enter it. After this operation new sub-menu, option list, parameter list or information window appears on the display.



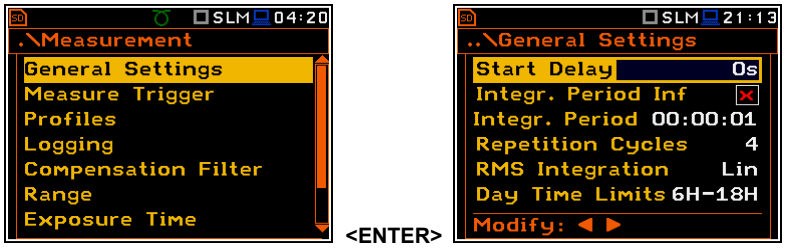
Measurement list opening

The option list consists of different options, from which the only one may be selected. The selection of the option is performed next way. The user has to highlight the desired option by means of **<▲>** or **<▼>** push-buttons and then press the **<ENTER>** one. This option became active and the list is closing. When the user enter this list again the selected option will be marked.



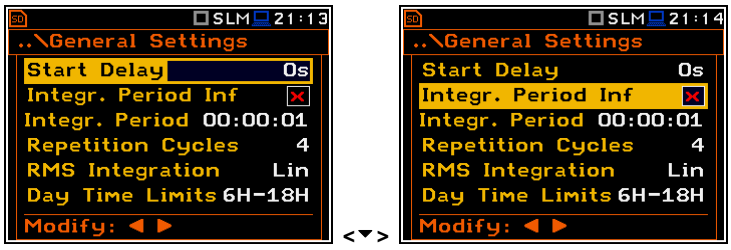
Spectrum Type *windows;* Velocity *option selection*

The parameter list contains parameters for which the user may select the value from the certain range. Next pressing of the **<ENTER>** push-button enables one to access mentioned above sub-lists.



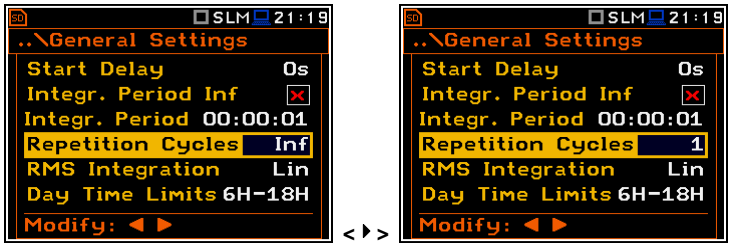
The parameter list window opening

The desired position of a list is accessed after pressing the **<▲>** or **<▼>** push-button.



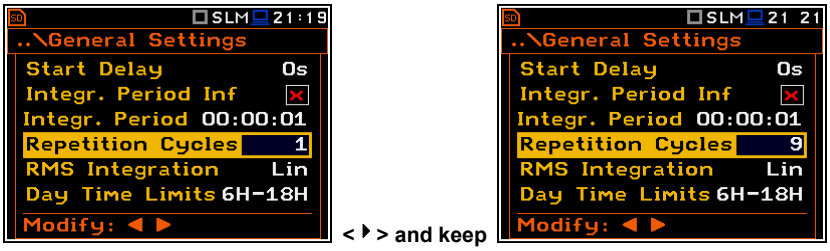
General Settings window; changing the parameter after pressing the <▼> push-button

The change of the value in a selected position is performed by the **<◄>** or **<►>** push-buttons (or pressed together with the **<Shift>** one).



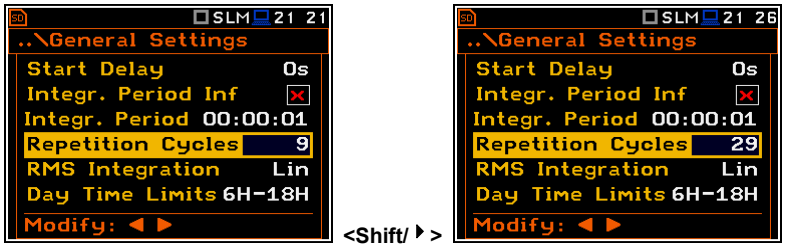
Repetition Cycles value selection after pressing the <►> push-button

If the parameter has numerical value the user may to speed up it's selection keep pressing the **<◄>** or **<►>** push-buttons (or pressed together with the **<Shift>** one) longer than 1 second. In this case parameter starts to change automatically until the user releases the pressed buttons.



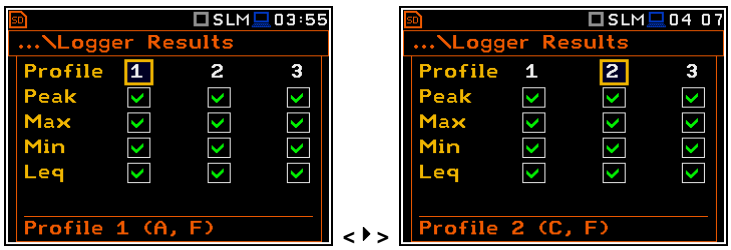
Repetition Cycles value selection after pressing and keeping the <►> push-button

The user may change the numerical parameter value with the step (usually 10, 20) by means of the **<◄>** or **<►>** push-buttons pressed together with the **<Alt>** one.



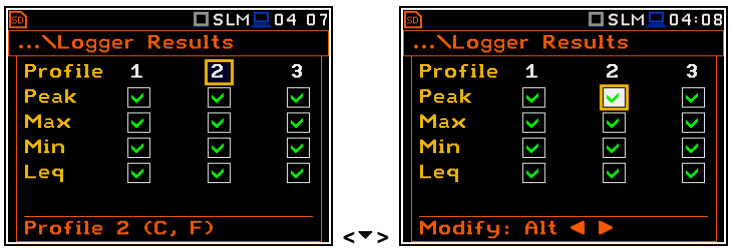
Repetition Cycles value selection after pressing the <►> push-button with the <Shift> one

When the list of parameters consists of more than one column the user may change the column with the use of **<◄>** or **<►>** push-buttons staying within the same line.



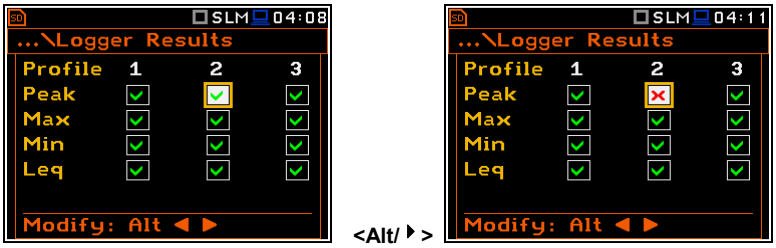
Logger Results list; column changing

With the use of **<▲>** or **<▼>** push-buttons the user may change the line in the same column.



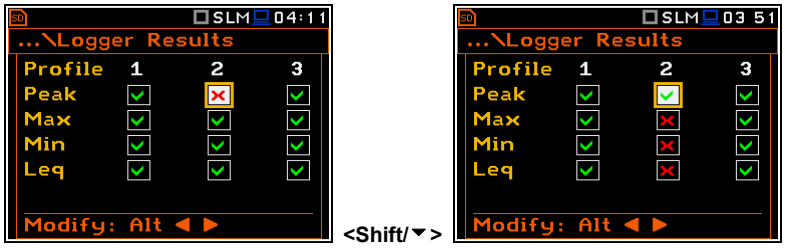
Logger Results list; line changing

The change of the value in a selected position is performed by the **<Alt>** and **<◄>** or **<►>** push-buttons pressed together.



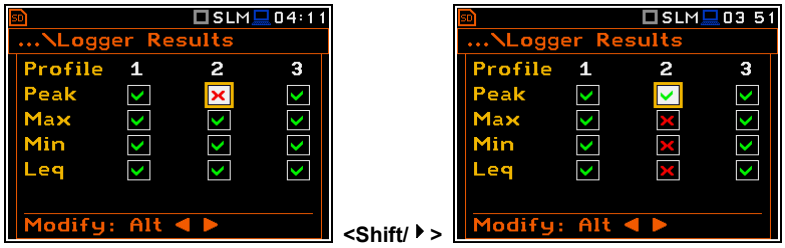
Logger Results list; Peak result for the second profile deactivation

With the use of **<▲>** or **<▼>** push-buttons pressed together with the **<Shift>** one the user may change all values in the same column.



Logger Results list; column values changing

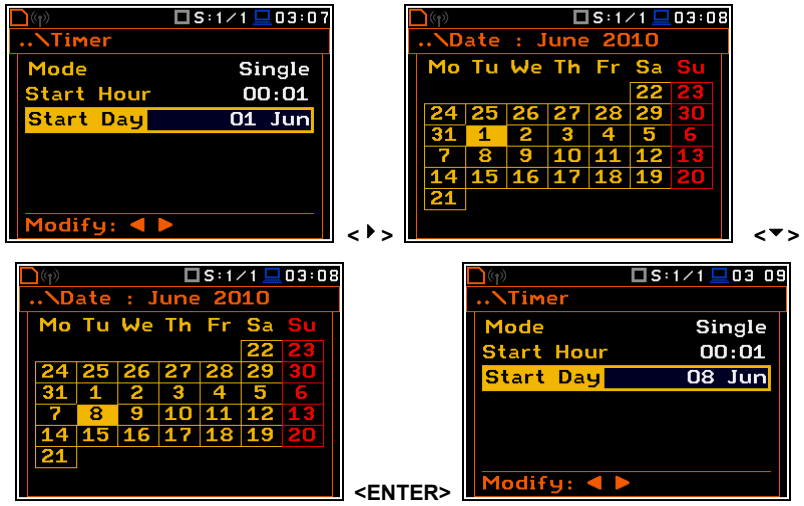
With the use of **<◄>** or **<►>** push-buttons pressed together with the **<Shift>** one the user may change all values in the same line.



Logger Results list; line values changing

Some parameters like **Start Hour**, **Start Day** etc. are complex (consists of more that one value field). The selection of values for such parameters is performed in a special window, which is opened with the **<◄>** or **<►>** push-buttons. In the special window the value is selected with the use of **<◄>**, **<►>** or **<▲>**, **<▼>** push-buttons and then is confirmed by **<ENTER>**.

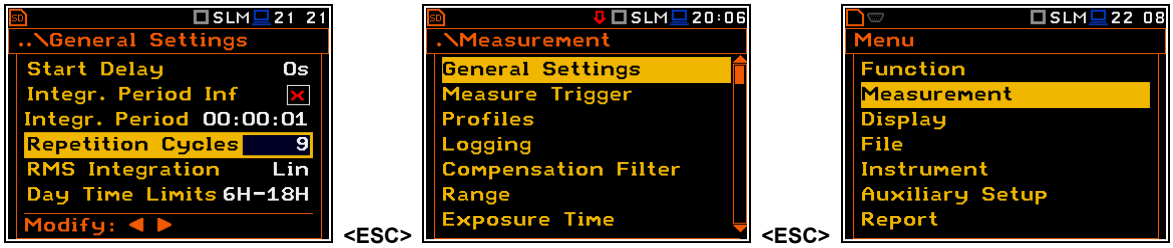
Timer windows; setting day of the instrument's switch on



Timer windows; setting day of the instrument's switch on

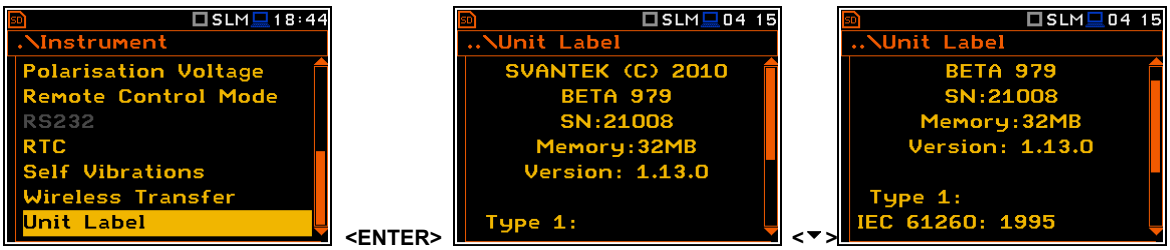
In all cases the **<ENTER>** push-button is used for the confirmation of the selection in a position and for closing the opened sub-list.

The sub-list is closed ignoring changes made in a sub-list by pressing the **<ESC>** push-button.



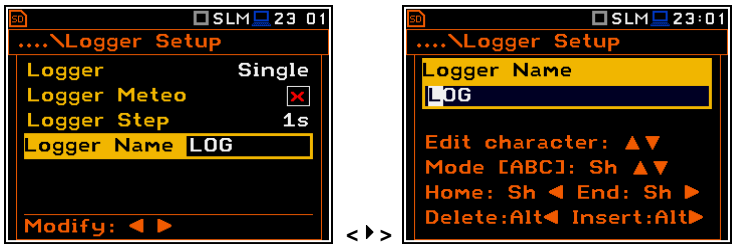
Displays after three consecutive pressing of the <ESC> push-button from the General Settings sub-list

As it was mentioned, some of the sub-lists end with the windows informing the user about the state of the instrument, available memory, not existing files or loggers, standards fulfilled by the unit, etc. In order to scroll the list, the user has to use the **<▲>** or **<▼>** push-button. In order to close such window, the user has to press the **<ESC>** push-button.



Displays with the accessed Unit Label position

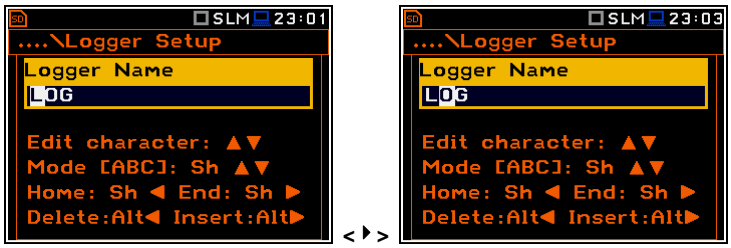
There are also windows, in which the user may edit some text (i.e. the name of the file, the header for the printed reports from the measurements). This window consists the help information to guide the user how to edit the text.



Logger Name edition in

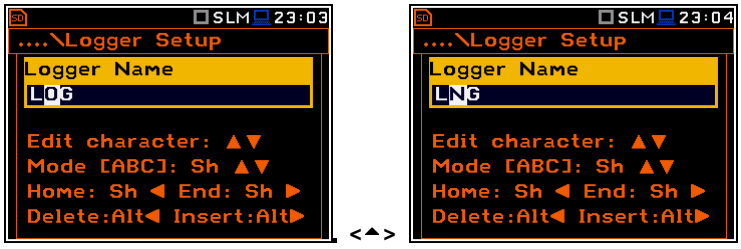
The edition process is presented on the Figures below.

The displayed inversely character may be edited. One can select the position of the character in the edited text using the **<◄>**, **<►>** push-buttons.



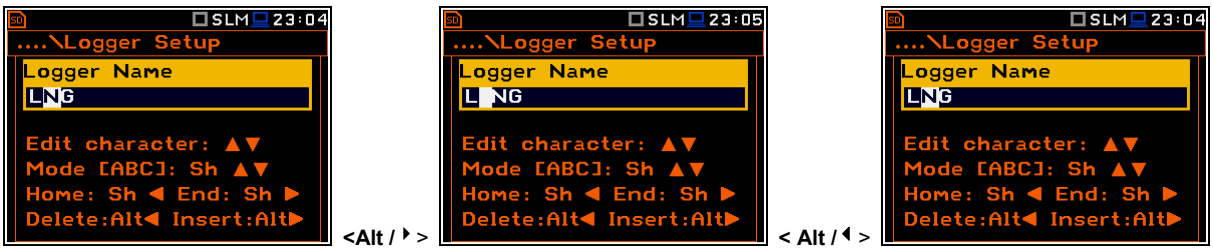
Display during the selection of the character's position to be edited

The available ASCII characters can be changed using the **<▲>** or **<▼>** push-button. The subsequent digits, underline, big letters and space appear on the display in the inversely displayed position after each pressing of the mentioned above push-buttons.



Display during the edition of the file name

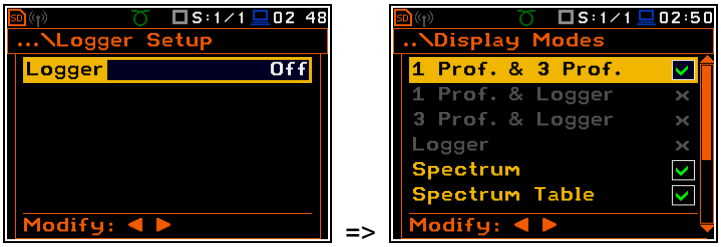
One can insert or delete the position in the edited text using the **<◄>**, **<►>** push-buttons pressed together with the **<Alt>** one.



Display during the edition of the file name

In the most windows the last line consists the help information. It informs the user how to select or modify the parameter's value, change the character in the text line etc.

If some functions or parameters are not active, the positions in the menu or parameter lists linked with this function or parameter became not active (their colour became grey). For example, if ***Logger*** (*path: <Menu> / Measurement / Logging / Logger Setup)* is switched off the **Logger** presentation mode is **not** active!



Display Modes window when Logger is swithed off

3.2. Structure of the instrument's menu

Below the structure of the elements of the main list is presented. The more detailed description of the **Function**, **Measurement**, **Display**, **File**, **Instrument**, **Auxiliary Setup** and **Report** lists is given in the following chapters.

- **Function** (available after pressing the **<Menu>** push-button)
  - **Mode**
    - **Sound Meter**: ⊙ / O
    - **Vibration Meter**: ⊙ / O
    - **Direct Sound**: ⊙ / O
    - **Direct Vibration**: ⊙ / O
  - **Measurement Function**
    - **Level Meter**: ⊙ / O
    - **1/1 Octave**: ⊙ / O
    - **1/3 Octave**: ⊙ / O
    - **FFT**: ⊙ / O
  - **Calibration**
    - **Calibr. by Sensitivity**
      - **Sensitivity**:
        - Vibration modes: **10 µV / ms^2** .. **10 V / ms^2**
        - Sound modes: **50 µV/Pa** .. **50 V/Pa**

- **Cal. Factor**: calculated calibration factor

▪ **Calibr. by Measurement**

- **Cal. Level**:
  - Vibration modes: **100 mm / s^2** .. **1 km / s^2** (or **100 dB** .. **180 dB** if the reference level was set to **1 µm / s^2** and the **Log** scale selected in the **Display Scale** sub-list)
  - Sound modes: **54 dB** .. **134 dB**
- **Cal. Factor**: calculated calibration factor after the measurement

▪ **Last Calibration**: last calibration records

▪ **Clear Calibr. History**;

❖ **Measurement** (available after pressing the **<Menu>** push-button)

➢ **General Settings**

▪ **Start Delay**: **1s** .. **60s**

▪ **Integr. Period Inf**: ☒ / ☑

▪ **Integr. Period**: **hh:mm:ss**

▪ **Repetition Cycles**: **Inf**, **1** .. **1000**

▪ **RMS Integration**: **Lin**, **Log**

▪ **Day Time Limits**: **6H-18H**, **7H-19H** (Sound modes)

➢ **Measure Trigger**;

- **Trigger**: **Off**, **Slope+**, **Slope–**, **Level+**, **Level–**, **Grad+**, **External**

If **Trigger** = **Slope+**, **Slope–**, **Level+**, **Level–**, **Grad+** then:

- **Source**: **RMS (1)**
- **Level**: **24 .. 136 dB** (Sound modes) or **1 mm / s^2 .. 10 km / s^2** (Vibration modes)

If **Trigger** = **Grad+** then

- **Gradient** : **1 dB / ms .. 100 dB / ms**

➢ **Profiles**

▪ **Filter(1)**:

- Vibration modes: **R3**, **R2**, **R1** (if activated), **Z**, **HP1**, **HP3**, **HP10**, **Vel1**, **Vel3**, **Vel10**, **VelMF**, **Dil1**, **Dil3**, **Dil10**, **Wh**
- Sound modes: **Z, A, C, B, G** and **R1**, **R2**, **R3** (if activated)

▪ **Detector(1)**:

- Vibration modes: **100ms**, **125ms, 200ms**, **500ms**, **1.0s**, **2.0s**, **5.0s**, **10.0s**
- Sound modes: **IMP.**, **FAST, SLOW**

▪ **Filter(2)**: same as for **Filter(1)**

▪ **Detector(2)**: same as for **Detector(1)**

▪ **Filter(3)**: same as for **Filter(1)**

▪ **Detector(3)**: same as for **Detector(1)**

➢ **Logging**

▪ **Logger Setup**

- **Logger**: **Off**, **Single**

If **Logger** = **Single** then:

- **Logger Meteo**: ☒ / ☑
- **Logger Step**: **2 ms .. 1 h**
- **Logger Name**: text input line (**LOG**)

▪ **Logger Results**

- **Peak P(1) P(2) P(3):** ☒ / ☑
- **Max P(1) P(2) P(3):** ☒ / ☑

- **RMS P(1) P(2) P(3): ☒ / ☑**
- **Min P(1) P(2) P(3): ☒ / ☑** (Sound modes)
- **P-P P(1) P(2) P(3): ☒ / ☑** (Vibration modes)
- **Spectrum: ☒ / ☑**

▪ **Logger Trigger**

- **Trigger**: **Off**, **Level+**, **Level–**, **Relative**

If **Trigger** = **Level +**, **Level –**, **Relative** then:

- **Source**: **Leq(1)** (Sound modes), **RMS(1)** (Vibration modes)

In case **1/1 Octave** additionally: **125Hz**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**), (in case **1/3 Octave** additionally: **125Hz**, **160Hz**, **200Hz**, **250Hz**, **315Hz**, **400Hz**, **500Hz**, **630Hz**, **800Hz**, **1.00kHz**, **1.25kHz**, **1.60kHz**, **2.00kHz**, **2.50kHz**, **3.15kHz**, **4.00kHz**, **5.00kHz**, **6.30kHz**, **8.00kHz**, **10.0kHz**, **12.5kHz**, **16.0kHz**, **20.0kHz**

- **Level**: **24 .. 136 dB** (Sound modes) or **1 mm / s^2 .. 10 km / s^2** (Vibration modes)
- **Pre: 0 .. 50**
- **Post: 0 .. 50**

▪ **Event Recording**

- **Events**: **Off**, **Continuous**, **On Trigger**

If **Events = Continuous** or **On Trigger** then:

- **Auto Sampling**: **48kHz**, **24kHz**, **12kHz**

If **Events** = **On Trigger** then:

- **Trigger**: **Off**, **Slope +**, **Slope -**, **Level +**, **Level -**, **Relative**, **External**
- **Trigger on Marker**: ☒ /☑

If **Trigger = Slope +**, **Slope -**, **Level +**, **Level -**, **Relative** then:

- **Source**: **Leq(1)** (Sound modes), **RMS(1)** (Vibration modes)

  In case **1/1 Octave** additionally: **125Hz**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**), (in case **1/3 Octave** additionally: **125Hz**, **160Hz**, **200Hz**, **250Hz**, **315Hz**, **400Hz**, **500Hz**, **630Hz**, **800Hz**, **1.00kHz**, **1.25kHz**, **1.60kHz**, **2.00kHz**, **2.50kHz**, **3.15kHz**, **4.00kHz**, **5.00kHz**, **6.30kHz**, **8.00kHz**, **10.0kHz**, **12.5kHz**, **16.0kHz**, **20.0kHz**
- **Level**: **24 .. 136 dB** (Sound modes)**, 1 mm / s^2 .. 10 km / s^2** (Vibration modes)

- **Rec. Time**: **1s** … **8h**
- **Pre Trigger: ☒ /☑**

▪ **Marker Setup**

- **1 Name Event Point**
- **2 Name Event Point**
- **3 Name Event Point**
- **4 Name Event Point**

▪ **Wave Recording**

- **Wave Rec.**: **Off**, **Continuous**, **On Trigger**

If **Wave Rec.** = **Continuous** or **On Trigger** then:

- **Format**: **PCM**, **Extensible**
- **Audio Sampling**: **12kHz**, **24kHz**, **48kHz**
- **Bits Per Sample**: **24**, **16**

If **Bits Per Sample = 16** then

- **Signal Gain**: **0dB .. 40 dB**

- **File Name: REC**

If **Wave Rec.** = **On Trigger** then

- **Trigger**: **Slope +**, **Slope -**, **Level +**, **Level -**, **External**

If **Trigger = Slope +**, **Slope -**, **Level +**, **Level -** then:

- **Source**: **Leq(1)** (Sound modes), **RMS(1)** (Vibration modes)
- **Level**: **24 .. 136 dB** (Sound modes) or **1 mm / s^2 .. 10 km / s^2** (Vibration modes)
- **Trigger Period**: **0.5ms**, **100.0ms**, **1s**
- **Rec. Time**: **1s** … **8h**
- **Pre Trigger**: ☒ /☑

➢ **Spectrum** (available for **1/1 Octave** or **1/3 Octave** modes)
- **Filter**: **Z**, **A**, **C** (Sound modes) or **Z** (Vibration modes)
- **Band: Full, Audio** (Sound modes) or **Full** (Vibration modes)

➢ **Compensation Filter** (available for **Sound Meter** and **Direct Sound** modes)
- **Off**: ⊙ / O
- **Free Field**: ⊙ / O
- **Diffuse Field**: ⊙ / O
- **Outdoor Environment**: ⊙ / O
- **Outdoor Airport**: ⊙ / O
- **Windscreen**: **Off**, **On**, **Auto**

➢ **Range**
- **Range : Low**, **High**

➢ **Exposure Time** (available for **Sound Meter** and **Direct Sound** modes): **1 m** .. **12 h**

➢ **Statistical Levels** (available for **Sound Meter** and **Direct Sound** modes)
- **N1**: **1** ... **99**
- **N2**: **1** ... **99**
- **….**
- **N10**: **1** ... **99**

➢ **Timer**
- **Mode**: **Off**, **Single**, **Multiple**

  If **Mode** = **Single** or **Multiple** then:
  - **Start Hour**: **hh:mm**
  - **Start Day**: **Day Month**

  If **Mode** = **Multiple** then
  - **Repetition**: **hh:mm**

❖ **Display**

➢ **Display Modes**
- **1 Prof. & 3 Prof.**: ☒ or ☑
- **1 Prof. & Logger**: ☒ or ☑
- **3 Prof. & Logger**: ☒ or ☑
- **Logger**: ☒ or ☑
- **Spectrum**: ☒ or ☑; this position is active only for **1/1 Octave**, **1/3 Octave** functions
- **Spectrum Table:** ☒ or ☑; this position is active only for **1/1 Octave**, **1/3 Octave** functions
- **Statistics**: ☒ or ☑; this position is active only for Sound modes
- **File Info:** ☒ or ☑
- **Meter Table:** ☒ or ☑
- **GPS**: ☒ or ☑

➢ **Display Scale**
- **Scale**: **Lin**, **Log** (Vibration modes) or **Log** (Sound modes)
- **Dynamic**: **80dB**, **40dB**, **20dB**, **10dB**

- **Grid**: ☒ or ☑
- **Autoscale**: ☒ or ☑

➢ **Spectrum View** (in the case of **1/1 Octave**, **1/3 Octave** analysis)

- **Type**: **Averaged**, **Instantaneous**, **Max**, **Min**

If **Mode** = **Averaged, Instantaneous** then:

- **Max**: ☒ or ☑
- **Min**: ☒ or ☑

➢ **Spectrum Type** (Vibration modes only)

- **Acceleration**: ⊙ / O
- **Velocity**: ⊙ / O
- **Displacement**: ⊙ / O

➢ **Logger View**;

- **Peak (1)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Max (1)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Min (1)** (Sound) **P-P (1)** (Vibration): **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **RMS (1)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Peak (2)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Max (2)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Min (2)** (Sound) **P-P (2)** (Vibration): **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **RMS (2)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Peak (3)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Max (3)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **Min (3)** (Sound) **P-P (3)** (Vibration): **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑
- **RMS (3)**: **Logger** ☒ / ☑ **Display** ☒ / ☑ **Color** ☒ / ☑

➢ **Spectrum Compare**

- **RMS Spectrum**;
  - **Active**: ☒ / ☑
  - **Comp.Spectrum**: **Result**
  - **Ref.Spectrum**: **File**
  - **File Name**: name of file with reference spectrum
  - **Warning**: **Off**, **Comp.>Ref.**, **Comp.<Ref.**

  If **Warning** = **Comp.>Ref.** or **Comp.<Ref.** then
  - **Tolerance**: **0.0dB .. 10.0dB**
  - **Lower Limit**: **All**, **1.00Hz**, **2.00Hz**, **4.00Hz**, **8.00Hz**, **16.0Hz**, **31.5Hz**, **63.0Hz**, **125Hz**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**, **TOTAL 1**, **TOTAL 2**, **TOTAL 3**, **TOTAL 4**
  - **Upper Limit**: **All**, **1.00Hz**, **2.00Hz**, **4.00Hz**, **8.00Hz**, **16.0Hz**, **31.5Hz**, **63.0Hz**, **125Hz**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**, **TOTAL 1**, **TOTAL 2**, **TOTAL 3**, **TOTAL 4**
- **LN Spectrum** (for Sound modes only)
  - **Active**: ☒ / ☑
  - **Comp.Spectrum**: **Result**
  - **Ref.Spectrum**: **File**
  - **File Name**: input line
  - **Warning**: **Off**, **Comp.>Ref.**, **Comp.<Ref.**

  If **Warning** = **Comp.>Ref.** or **Comp.<Ref.** then
  - **Tolerance**: **0.0dB .. 10.0dB**

- **Lower Limit**: **All**, **1.00Hz**, **2.00Hz**, **4.00Hz**, **8.00Hz**, **16.0Hz**, **31.5Hz**, **63.0Hz**, **125Hz**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**, **TOTAL 1**, **TOTAL 2**, **TOTAL 3**, **TOTAL 4**
- **Upper Limit: All, 1.00Hz, 2.00Hz, 4.00Hz, 8.00Hz, 16.0Hz, 31.5Hz, 63.0Hz, 125Hz, 250Hz, 500Hz, 1.00kHz, 2.00kHz, 4.00kHz, 8.00kHz, 16.0kHz**, **TOTAL 1**, **TOTAL 2**, **TOTAL 3**, **TOTAL 4**

- **Screen Setup**
  - **Brightness**
  - **Dim screen on idle**: ☒ / ☑
  - **Dim screen delay**: **5s .. 60s**
  - **Screen off on idle**: ☒ / ☑
  - **Screen off delay**: **1m .. 60m**
- **Themes**
  - **Solar**: ⊙ / O
  - **Forest**: ⊙ / O

❖ **File** ; (available after pressing the **<Menu>** push-button)

- **File Manager**; it enables the user to check the contents of the memory, setting the working memory or directory and make operation on the result and logger files such as: open, delete, copy. move, rename files, create new file or directory and display file information.
- **Setup Manager**; it enables the user to check the contents of the memory and make operation on the setup files such as: open, delete, copy. move, rename files, create new files and directories and display file information
- **Save Options** (sub-list)
  - **RAM File**; (only in **Level Meter** mode) : ☒ or ☑
  - **Replace**: ☒ or ☑
  - **Save Statistics**: ☒ or ☑
  - **Auto Save**: ☒ or ☑
  - If **Auto Save** = ☑ then
    File Name: text input line (**@RES**)
  - **Direct Save**: ☒ or ☑
  - **Save Max Spectrum**: ☒ or ☑
  - **Save Min Spectrum**: ☒ or ☑

❖ **Instrument**; (available after pressing the <Menu> push-button)

- **Battery**; information about current power source
- **Bluetooth**;
  - **Authorisation Code**: text input line
  - **Visible**: ☒ or ☑
  - **Transf. on stop only**: ☒ or ☑
- **Communication Ports**;
  - **USB Host**: ☒ or ☑
  - **RS232**: ☒ or ☑
  - **Bluetooth**: ☒ or ☑
  - **GPS Host Port**: ☒ or ☑
  - **GPS Device Port**: ☒ or ☑
- **External Power**;
  - **Power Off**: ☒ or ☑

- **Limit**: **6.0V .. 24.0V**

- **GPS**;
  - **Time Zone**: **UTC+00:00**
  - **GPS Synchronization**: ☒ or ☑
- **IEPE Current**;
  - **IEPE Off**: ⊙ / O
  - **IEPE Current 1.5 mA**: ⊙ / O
  - **IEPE Current 4.5 mA**: ⊙ / O
- **Keyboard Settings;**
  - **Shift/Alt**: **Direct** or **2nd Fun.**
  - **Sart/Stop: Direct** or **With Shift**
  - **Backlight**: ☒ or ☑
  - **Push Key Sound**: ☒ or ☑
- **Modem Status**; information window; active only when the GPRS function is switched on
- **Multifunction I/O**;
  - **I/O Mode**: **Analog Out**, **Digital In**, **Digital Out**

  If **I/O Mode** = **Analog Out** then
  - **Direct**: ☒ or ☑
  - **D/A**: ☒ or ☑

  If **I/O Mode** = **Digital In** then
  - **Function**: **Ext. Trigger**
  - **Slope**: **[+]** or **[-]**

  If **I/O Mode** = **Digital Out** then
  - **Function**: **Trig. Pulse**, **Alarm Pulse**

  If **Function** = **Trig. Pulse** then
  - **Polarisation**: **Pos.**, **Neg.**

  If **Function** = **Alarm Pulse** then
  - **Active Level**: **Low**, **High**
  - **Source**: **PEAK(1)**, **SPL(1)**, **Max(1)**, **LEQ(1)**,
  - **Source Type**: **Current**, **Periodic**
  - **Alarm Level**: **30.0 dB** .. **140 dB**
  - **Send SMS**: ☒ or ☑
  - **Send E-Mail**: ☒ or ☑
- **Polarisation Voltage**;
  - **0V**
  - **200V**
- **Remote Control Mode**;
  - **Off**
  - **On**
- **RS232**;
  - **Baud Rate**: **1200**, **2400**, **4800**, **9600**, **19200**, **38400**, **57600**, **115200**
  - **Time Out**: **1s** .. **60s**
- **RTC**;
  - **Time**: **hh:mm:ss**
  - **Date**: **day month year**
- **Self Vibration**; information window
  - **X: xx.x dB**
  - **Y: yy.y dB**

- **Z: zz.z dB**

➢ **Wireless Transfer**;

- **Network**;
  - **Off**: ⊙ / O
  - **GPRS**: ⊙ / O
  - **Modbus**: ⊙ / O
- **Data Transfer**
  - **Type**: **Off**, **Packet**, **Continuous**

  If **Type = Packet** then
  - **Packet**: **64**, **128**, **256**, **512**, **1024**
- **Modem**; (active if **GPRS** is selected)
  - **Internet Cfg**: ☒ or ☑
  - **Data Protocol**: **TCP S**, **TCP C**, **UDP**
  - If **Data Protocol** = **TCP S** then:

    Register Mode: Off, On, AS, SMT.AS
  - If **Data Protocol = UDP** then:

    Register Mode: ☒ or ☑
  - **Sim Auth Mode**: **none**. **PAP**, **CHAP**, **MsChap**
  - **Send SMS**: ☒ or ☑
  - **Send E-Mail**: ☒ or ☑
  - **Auto Reconnection**: ☒ or ☑
  - **Reconn. Delay**: **1s** ... **1m**
  - **TCP IRT**: **1s** ... **60s**
  - **TCP Max. Ret.**: **1** ... **30**
- **Modem Connection**; (active if **GPRS** is selected)
  - **Server Address**: text input line (**svantek.dyndns.org**)
  - **Data Port**: text input line (**8001**)
  - **Registration Port**: text input line (**8000**)
  - **APN**: text input line (**m2m.plusgsm.pl**)
  - **APN User**: text input line (**none**)
  - **APN Password**: text input line (**none**)
  - **DNS Server**: text input line (**0.0.0.0**)
- **SMS Options**; (active if **GPRS** is selected)
  - **Phone Number**: text input line
  - **Text Message**: text input line (**default**)
- **E-mail Settings**; (active if **GPRS** is selected)
  - **SMTP Address**: text input line (**smtp.mail.com**)
  - **User Login**: text input line (**default**)
  - **User Password**: text input line (**default**)
  - **Sender e-mail**: text input line
  - **Recipient e-mail**: text input line
  - **E-mail Subject**: text input line
  - **E-mail Message**: text input line
- **Modbus**; (active if **Modbus** is selected)
  - **Modbus Addr.**: **1** ...
  - **Modbus # CMD.**: ☒ or ☑
  - **Mb-H.Reg.Map**: ☒ or ☑
  - **Mb-Map Index**: **1** ...

- **Unit Label**; it informs the user about the type of the instrument, the serial number of the unit, the internal memory size, available measurement modes and it's software version and the standards which the instrument fulfils

❖ **Auxiliary Setup** (available after pressing the **<Menu>** push-button)

- **Language**:
  - **English**: ⊙ / O
  - **Deutsch**: ⊙ / O
  - **Espanol**: ⊙ / O
  - **Francais**: ⊙ / O
  - **Magyar**: ⊙ / O
  - **Norsk**: ⊙ / O
  - **Polski**: ⊙ / O
  - **Русский**: ⊙ / O
  - **Turkish**: ⊙ / O
  - **Nederlands**: ⊙ / O
- **Factory Settings**; it enables the user to return to the factory settings of the instrument; the confirmation has to be done before the execution of this function
  - **Are you sure?**: **Yes/No**
- **Human Vibration Filters**; it enables the user to activate Human Vibration Filters. This position appears only in Vibration modes before activation of those filters
  - **Enter Code**:
- **Reference Levels:**
  - Vibration modes:
    - **Acc**: **1 µm/s^2** ... **100 µm/s^2**
    - **Vel**: **1 nm/s** ... **100 nm/s**
    - **Dil**: **1 pm** ... **100 pm**
  - Sound modes: **20 µPa**
- **User Filters**;
  - **Real Time Filters**
    - **Rx** (**R1**, **R2**, **R3**)
      - **Type**: **Highpass**, **Bandpass**, **Lowpass**
      - **LFC(3dB**); low frequency corner at 3 dB; position available for **Highpass** and **Bandpass** with the values: **100.00 Hz** .. **10.00 kHz**
      - **HFC(3dB)**; high frequency corner at 3 dB; position available for **Bandpass** and **Lowpass** with the values: **100.00 Hz** .. **10.00 kHz**
  - **Spectrum Based Filter**; this position is active only for **1/1 Octave**, **1/3 Octave** functions
    - **Filter Select** (Sound modes)
      - **User Total 1**: **Off**, **S1**, **S2**, **S3**
      - **User Total 2**: **Off**, **S1**, **S2**, **S3**
      - **User Total 3**: **Off**, **S1**, **S2**, **S3**
    - **Filter Select** (Vibration modes)
      - **User Total 1**
        - **Filter**: **Off**, **S1**, **S2**, **S3**

        If **Filter = S1**, **S2**, **S3** then
          - **Type**: **Acceleration**, **Velocity**, **Displacement**
        - **Cal. Factor**: **0.0dB .. 60.0dB**
      - **User Total 2**: **Off**, **S1**, **S2**, **S3**

- **User Total 3**: **Off**, **S1**, **S2**, **S3**

- **Filter Edit**
  - **S1**
    - **Filter Name**: **S1** (can be edited)
    - **0.00 Hz**: **-100.0dB** .. **100.0dB**
    - **1.00 Hz**: **-100.0dB** .. **100.0dB**
    - ...
    - …
    - **20.0 kHz**: **-100.0dB** .. **100.0dB**
  - **S2**,
  - **S3**
- **Filter Clear**; it enables the user to clear the values of the user coefficients of octave or third octave filters:
  - **All**,
  - **S1**,
  - **S2**,
  - **S3**

➢ **Vibration Units** (sub-list appears only when Vibration modes are selected)
- **Metric** (e.g. **m/s^2**, **m/s**, **m**): ⊙ / O
- **Non-Metric** (e.g. **g, ips, mil**): ⊙ / O

➢ **Warnings**
- **Results Not Saved**: ☒ or ☑
- **Ext. Disk Free Space**: ☒ or ☑
- **Min Free Space**: **1 MB** .. **1024 MB**
- **Save Changes**: ☒ or ☑
- **Windscreen**: ☒ or ☑
- **Preamplifier**: ☒ or ☑
- **Self Vibration Level**: ☒ or ☑
- **Power Off**: ☒ or ☑
- **GPS Signal Lost**: ☒ **or** ☑

❖ **Report** (available after pressing the **<Menu>** push-button, to use option from this list the instrument has to be connected to RS232 or to a PC connected to a printer)

➢ **Print Results**; it enables the user to print measurement results on the attached printer, the **No results** text is displayed in the case when there is no results to be printed

➢ **Print Statistics**; it enables the user to print the results of the statistical analysis, the **No results** text is displayed in the case when there is no results to be printed

➢ **Print User Filters**; it enables the user to print out on a printer connected directly to the instrument the values of the user filters introduced in the instrument: **S1**, **S2**, **S3**

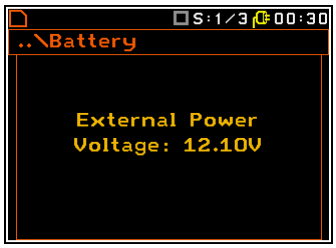
➢ **Options**
- **Format**: **A4**, **A5**
- **Eject Page**: **None**, **Prompt**, **Auto**
- **Title**: text input line.

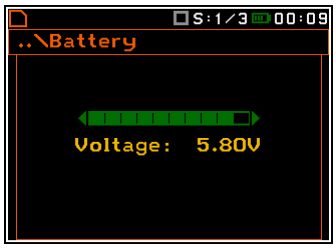
3.3. Powering of the instrument

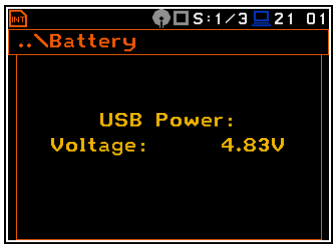
The **SVAN 979** can be powered by one of the following sources:

- External DC power source – 6 V DC÷24 V DC (1.5 W)
- SA 17A external battery pack – operation time > 24 h (option)
- Four AA standard internal batteries. In the case of alkaline type, fully charged set can operate more than 12 h (6.0 V / 1.6 Ah). Instead of the ordinary, four AA rechargeable batteries can be used (for charging them the separate charger is required). In this case, using the best NiMH type, the operation time can be increased up to 16 h (4.8 V / 2.6 Ah)
- **USB** interface – 500 mA HUB

For each of three kinds of the powering source there is a different view presented in the **Battery** window of the **Instrument** list.

a) 

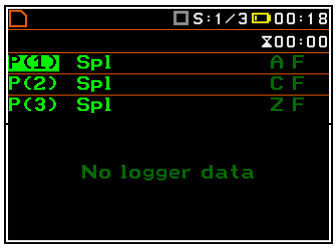
b) 

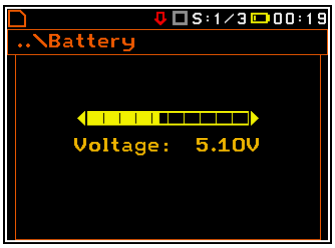
c) 

Battery windows for different sources powering the instrument: external DC power and SA 17A (a), batteries (b) and USB power (c)

When the instrument is powered from batteries, the **"Battery"** icon is presented on the top of the display. When voltage of the batteries is too low, the icon is red or during attempt of switching on the **Low Battery!** message occurs on the display for 2 seconds and the instrument switches off by itself. To change the batteries the user has to switch off the instrument, take off the black bottom cover of the instrument, unscrew battery cover, change the batteries and reassemble the parts of the instrument. The fully charged battery ensures more than 12 hours of the continuous work of the instrument (with the backlight off). The battery condition can be checked by means of the **Battery** function. It is also presented continuously on the display by means of the **"Battery"** icon.

a)



b) 

Displays with the "Battery" icon (a) and in the Battery window (b)

Display with Low Battery message

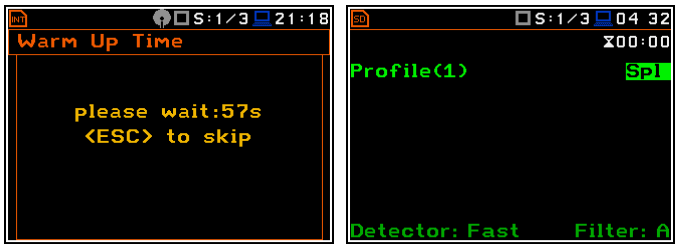
When there is a connection to the USB interface (**USB Device** socket is connected by means of the cable to a PC), the **"Computer"** icon is presented on the top of the display and in the **Battery** window, there is the **USB Power: Voltage: 0.00V** message.

Notice: *In the case when* ***"Battery"*** *icon is red, it is strongly recommended to use as soon as possible the external power adapter or USB interface. In the other case the instrument after a while will be switched off automatically!*

The saving of the internal source of the instrument's power can be achieved by means of reducing the brightness of the screen when possible. The settings of **Brightness** and power saver function may be done in the **Screen Setup** window (*path: <Menu> / Display / Screen Setup)*.

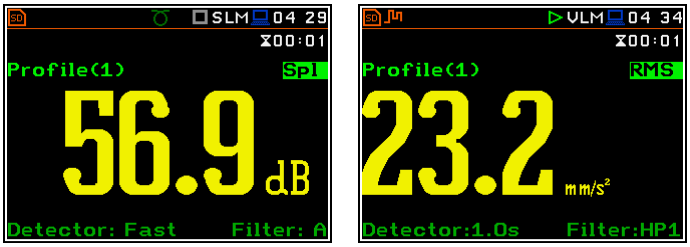
3.4. Initial Setup of the instrument

The instrument passes the self-test after switching on (in this time the producer and the name of the instrument is displayed on the display) and then it enters the sound mode. The default display mode for result's presentation is one profile.



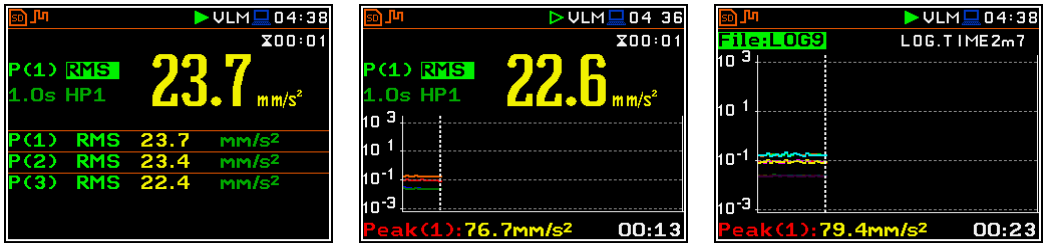
Displays after switching on the instrument in Sound mode

To start the measurements the user has to press the **<Start/Stop>** push-button. The result of the measurement is displayed with the unit of the measurement in so-called one profile mode.



Displays in one profile for Sound and Vibration modes

One profile mode is always available for most Functions of the instrument. The results of the measurements can be also presented in combined mode. In this mode the screen is divided into two parts and the results for one profile and three profiles can be presented together, as well as for one profile and logger and for three profiles and logger.



Displays in combined modes for Vibration measurements

The default settings (set up by the producer) for the profiles are as follows:

Sound measurements:

Profile 1 - **A** weighting filter (**Filter(1)=A**), **Fast** type of the RMS detector (**Detector(1)=Fast**), the results of the measurements are not stored in the logger's file;

Profile 2 - **C** weighting filter (**Filter(2)=C**), **Fast** type of the RMS detector (**Detector(2)=Fast**), the results of the measurements are not stored in the logger's file;

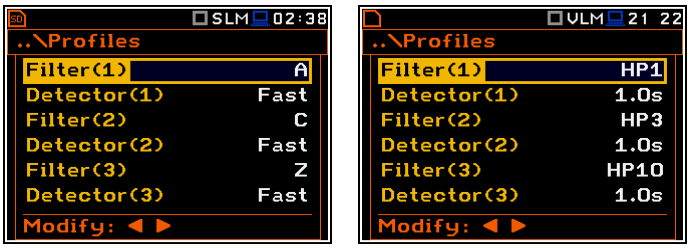
Profile 3 - **Z** weighting filter (**Filter(3)=Z**), **Fast** type of the detector (**Detector(3)=Fast**), the results of the measurements are not stored in the logger's file;

Vibration measurements:

Profile 1 - **HP1** weighting filter (**Filter(1)=HP1**); **1.0s** type of the RMS detector (**Detector(1)=1.0s**), the results of the measurements are not stored in the logger's file;

Profile 2 - **HP3** weighting filter (**Filter(2)=HP3**), **1.0s** type of the RMS detector (**Detector(2)=1.0s**), the results of the measurements are not stored in the logger's file;

Profile 3 - **HP10** weighting filter (**Filter(3)=HP10**), **1.0s** type of the RMS detector (**Detector(3)=1.0s**), the results of the measurements are not stored in the logger's file;

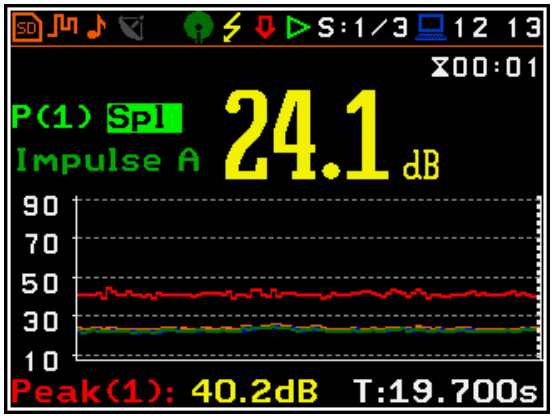


Default settings of the Profiles in Sound and Vibration modes

The user can change all mentioned above settings using **Profiles** sub-list of the **Measurement** list. The instrument remembers all changes. The return to the default settings (set up by the producer) is possible after the execution of the **Factory Settings** position available in the **Auxiliary Setup** list.

3.5. Icons description

Additional information about the instrument's state is given by means of the icon's row visible in the top of the display.



Display with available icons

The meanings of the icons are as follows:

	"play" icon is displayed when the instrument is the measurement is started and executed the measurement. .
	"stop" icon is displayed when the measurement is stopped.
	"pause" icon is displayed when the measurement is paused.
	"satellite" icon is displayed when GPS is active. Colours of the icon define the state of the GPS: green – active, blue – searching, grey – disconnected.
	"antenna" icon is displayed when the wireless transmission is active (**GPRS** or **Modbus** is active).
	"computer" icon is displayed when there is the USB connection with the PC.
	"curve" icon is presented when the current measurement results are logged in the instrument's logger file.
	"arrow up" icon is displayed when overload appears.
	"arrow down" icon is displayed when underrange appears.
	"USB Disk" icon is displayed when USB disc is assigned for file saving. USB disc is connected and activated.
	"tone" icon is displayed during wave recording and event recording.
	"windscreen" icon is displayed when windscreen is applied.
	"cable" icon is displayed when the microphone is connected via extension cable.

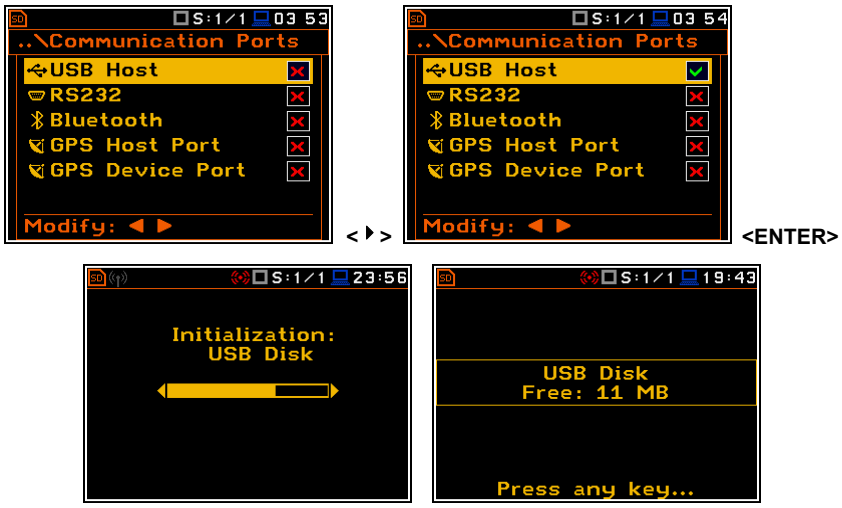
	"lightning" icon is displayed when polarisation voltage is 200V.
	"plug" icon is displayed when the instrument is powered from the external source.
	"Internal memory" icon is displayed when internal memory is assigned for file saving.
	"**SD Card**" icon is displayed when external SD card memory is assigned for file saving. Micro SD card is connected.
	"vibration" icon is displayed when self vibration level is exceeded.
	"RS232" icon is displayed when RS232 port is activated.
	"battery" icon is displayed when the instrument is powered from the batteries. Icon corresponds to the batteries state (three, two, one or none vertical bars in side of the icon). When voltage of batteries is too low, the icon became red.
	"clock" icon is displayed when timer is **On**. Is active when the instrument is waiting for the measurement start up. When the measurement start up is close, the icon change its colour to green and stats to blink.
	"Trigger Level +" icon is displayed when the trigger condition is set up to „**Level+**". The icon appears alternately with the „play" icon.
	"Trigger Level –" icon is displayed when the trigger condition is set up to „**Level-**".
	"Trigger Slope +" icon is displayed when the trigger condition is set up to „**Slope+**".
	"Trigger Slope –" icon is displayed when the trigger condition is set up to „**Slope-**"
	"Alt" icon is displayed when the **<Alt>** push-button is pressed.
	"Shift" icon is displayed when the **<Shift>** push-button is pressed.
	"Bluetooth" icon is displayed when the **Bluetooth** is switched on. Colours of the icon define the state of the **Bluetooth**: blue – connected, grey – disconnected.

The type of measurement function and the measurement mode (SLM, VLM, S:1/3 etc.) as well as RTC is also displayed in the same line together with icons.

3.6. Memory organisation

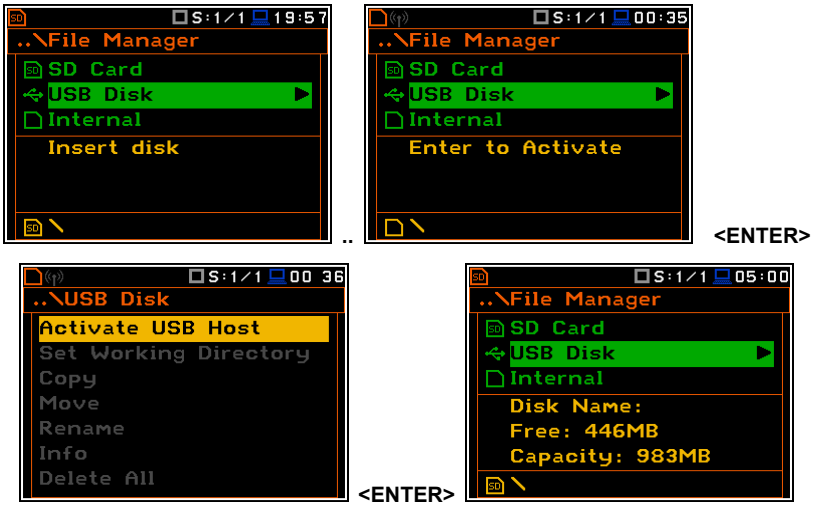
All available measurement results can be stored in the internal FLASH type memory of the instrument (32 MB) or in the external Memory (**SD Card** or **USB Disk**). Device settings are kept only in the internal memory. Logger, wave and event results can be stored only in the external Memory.

The **SD Card** external memory is activated automatically after insertion of the card. The initialization of the **USB Disk** is needed and is performed in the **Communication Ports** window of the **Instrument** menu.



Activation of the USB-disk memory

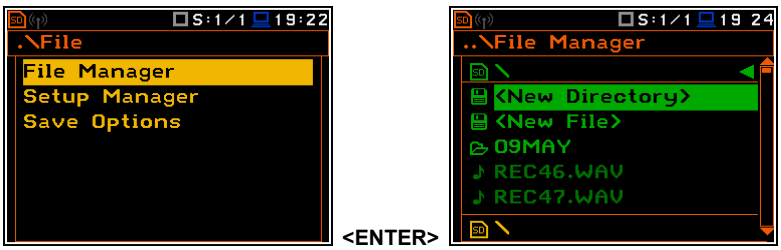
The **USB Disk** memory can be also activated in the **File Manager** window. For this one should select the **USB Disk** position and press the **<ENTER>** push-button. Then in the Command list select the **Activate USB Host** position and press the **<ENTER>** push-button again.



Activation of the USB-disk memory

The **SD Card** and **USB Disk** memory is organised as standard memory with directories and sub-directories. It is possible to create and to delete the directory.

The content of each memory type can be checked with the help of the **File Manager** or **Setup Manager** function of the **File** menu.



Checking the content of the memory

To change the memory type one should press the **<◄>** push-button in the **File Manager** window, select the memory type by means of the **<▲>**, **<▼>** push-buttons and press the **<►>** one.

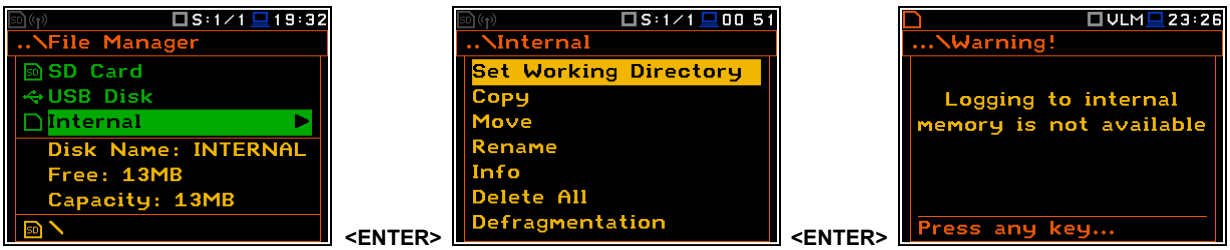
Changing the memory type for checking the content

The file is saved in the Memory and in the catalogue, which was set up as a working. The working Memory type is displayed as the icon in the left position of the icon line.

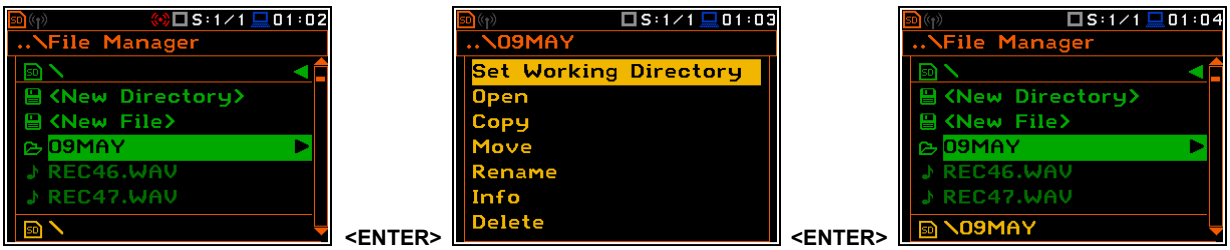
	"USB Disk" icon is displayed when USB disc is assigned for file saving. USB disc is connected and activated.
	"Internal" memory icon is displayed when internal memory is assigned for file saving.
	"SD Card" icon is displayed when external SD card memory is assigned for file saving. Micro SD card is connected.

The working directory is described in the bottom line of the **File Manager** window.

To change the working directory and/or working memory one should select the Memory type and in case of **SD Card** or **USB Disc** the desired directory and press the **<ENTER>** push-button. After the new window is opening one should select the **Set Working Directory** position and press the **<ENTER>** push-button again. The icon on the upper line and the directory path on the bottom line will be changed accordingly. Same algorithm is applied for directory changing for **SD Card** and **USB Disk** memory.



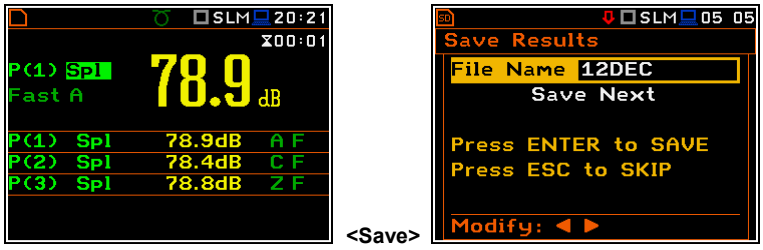
Setting the internal memory as working memory



Setting the new directory as working one

There are two options for storing result data in the internal or external memory. One option is to press **<Save>** push-button right after the measurement performance. Another option is to create **<New File>** in the **File Manager**.

After pressing the **<Save>** push-button the **Save Results** window appears.



Save Results window opening

In the **Save Results** window the user can give the name for the result file or choose automatic name generation option: **Save Next**, which saves a file with the name increased by one. The **Save** function saves a file with the edited name. These functions can be selected by means of the **<◀>**, **<▶>** push-buttons.

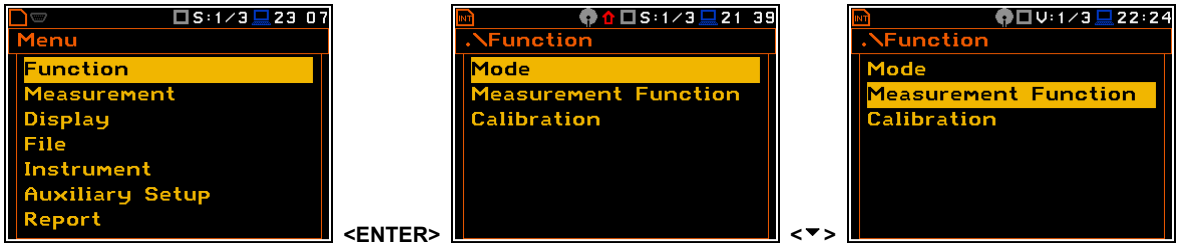
The Setup files can be stored also by means of **<S/P>** push-button and creating the **<New File>** in the **Setup Manager** list.

The logger, wave and event files are created automatically in the assigned directory on the external memory driver.

The user can copy or move data from the internal memory of the device and store new data in the external memory.

4. FUNCTIONS OF THE INSTRUMENT – Function

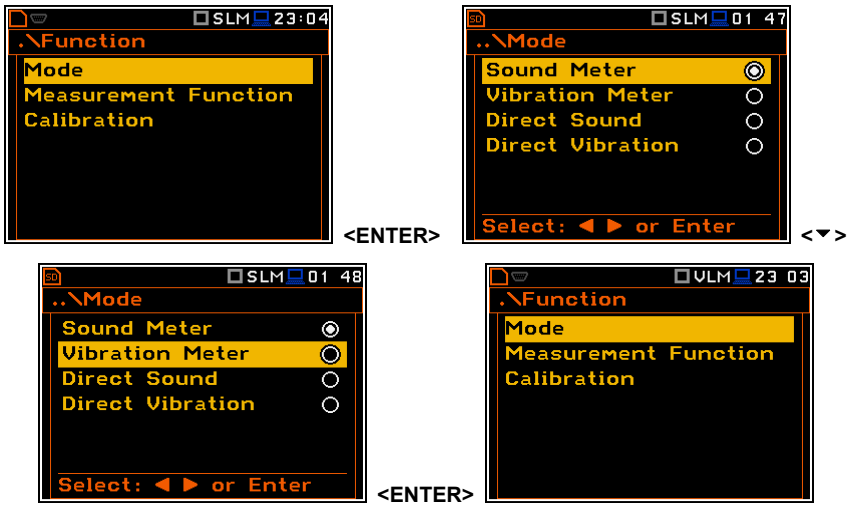
In order to select the **Function** list one has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**. The **Function** list contains three elements: **Mode**, **Measurement Function** and **Calibration**.



Function window; Measurement Function selection

4.1. Selecting the mode of the instrument – Mode

The device can work in four modes – two sound modes: **Sound Meter** and **Direct Sound**; and two vibration modes: **Vibration Meter** and **Direct Vibration**.



Displays with Vibration Meter mode selection

Notice: *In the manual text Sound mode (or Sound measurements) refers to the* ***Sound Meter*** *and* ***Direct Sound*** *modes and the proper functions dedicated for the measurement and analysis of the acoustic signal:* ***Level Meter****,* ***1/1 Octave****,* ***1/3 Octave****,* ***FFT****; Vibration mode (or Vibration measurements) refers to the* ***Vibration Meter*** *and* ***Direct Vibration*** *modes and the proper functions dedicated for the measurement and analysis of the vibration signal:* ***Level Meter****,* ***1/1 Octave****,* ***1/3 Octave****,* ***FFT****.*

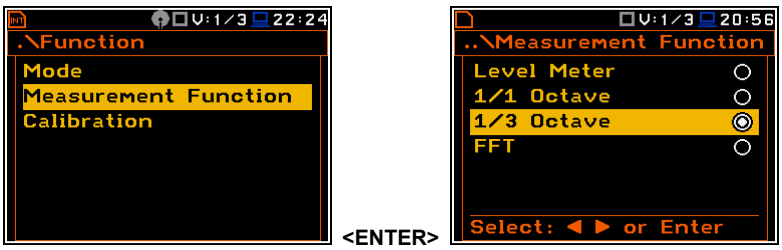
4.2. Measurement functions of the instrument - Measurement Function

The main function of the instrument is the measurement of Sound or Vibration level (**Level Meter**). The Sound Level Meter (SLM) function provides the user with the functions meeting the IEC 61672:2002

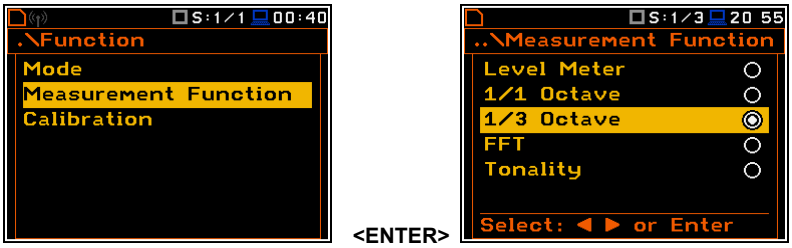
standard for Type 1 accuracy and the functions of Vibration Level Meter (VLM) meeting the ISO 8041:2005 standard. The instrument can also be used for the long-term acoustic monitoring using for this purpose the huge logger, in which the measurement results are stored.

The user may also use 1/1 and 1/3 octave analysis functions. These functions broaden the main Level Meter functions of the instrument, because 1/1 and 1/3 analysis is performed together with all calculations of Level Meter functions.

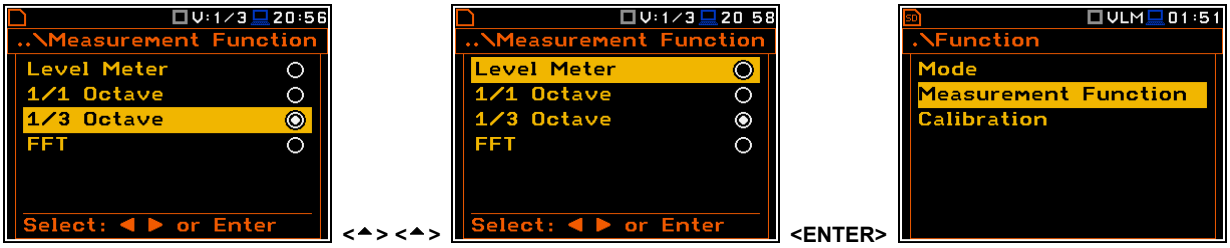
In order to select the required function the user has to enter the **Measurement Function** list. After entering the **Measurement Function** list, the set of the available functions appears on the display: **Level Meter**, **1/1 Octave**, **1/3 Octave** and **Loudness** (in case of Sound modes). Currently active function is marked.



Measurement Function window opened in Vibration mode



Measurement Function window opened in Sound mode



Measurement Function window; selection of the Level Meter function in Vibration mode

The type of measurement function and the measurement mode is displayed at the upper line of the screen:

- ***SLM*** ***Sound Level Meter***,
- ***S: 1/1*** ***Sound 1/1 Octave***,
- ***S: 1/3*** ***Sound 1/3 Octave***,
- ***S: 1/3*** ***Sound 1/3 Octave***,
- ***S: FFT*** ***Sound FFT***,
- ***DSLM*** ***Direct Sound Level Meter***,
- ***DS: 1/1*** ***Direct Sound 1/1 Octave***,
- ***DS: 1/3*** ***Direct Sound 1/3 Octave***,
- ***DS: FFT*** ***Direct Sound FFT***
- ***VLM*** ***Vibration Level Meter***,
- ***V: 1/1*** ***Vibration 1/1 Octave***,
- ***V: 1/3*** ***Vibration 1/3 Octave***,
- ***V: FFT*** ***Vibration FFT***,

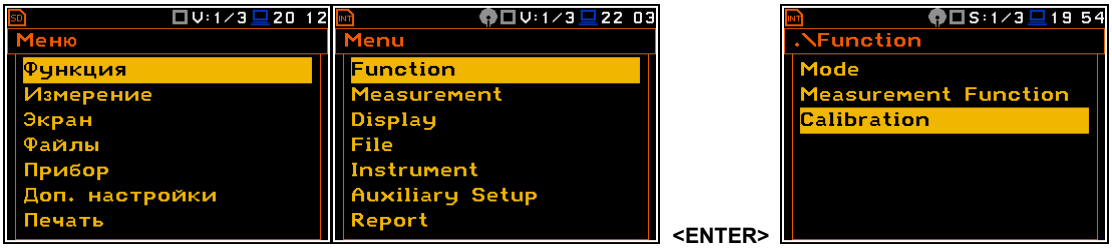
- ***DVLM*** ***Direct Vibration Level Meter***,
- ***DV: 1/1*** ***Direct Vibration 1/1 Octave***,
- ***DV: 1/3*** ***Direct Vibration 1/3 Octave,***
- ***DV: FFT*** ***Direct Vibration FFT***.

Optional functions that broadening the applications of the instrument can be install. These options can be supported by the producer or purchased later.

Note: *It is not possible to change the measurement function during the measurements. The instrument displays in this case for about 3 seconds the text:* ***"Measurement in Progress"****. In order to change the mode of the instrument the measurement must be finished!*

4.3. Instrument's calibration – Calibration

The instrument is factory calibrated with the supplied microphone for the standard environmental conditions. Because the microphone sensitivity is a function of the temperature, ambient pressure and humidity, when the absolute sound pressure level value is important, the calibration of the measurement channel has to be done. In order to select a calibration function the user has to enter the **Calibration** sub-list.



Calibration position selection

The **Calibration** sub-list consists of four positions: **Calibr. by Sensitivity**, **Calibr. by Measurement**, which are used to perform the calibration, **Last Calibration**, which contains the list of the performed earlier the calibration measurements and the obtained results and **Clear Calibr. History**.

Note: *The calibration factor is always added to the results in the* ***Level Meter****,* ***1/1 Octave****,* ***1/3 Octave****,* ***FFT*** *and other modes.*

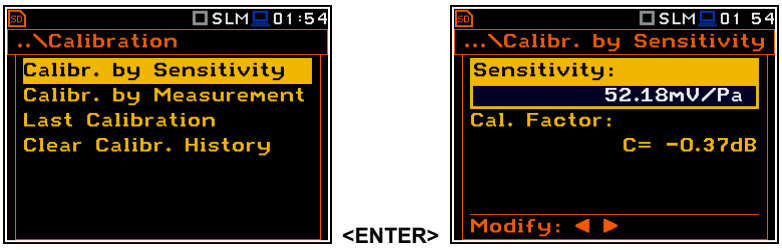
Note: *The calibration level and the calibration result is expressed in different units depending on the settings of the instrument. The metric or non-metric Vibration units are set in the* ***Vibration Units*** *(path: <Menu> / Auxiliary Setup / Vibration Units). Additionally, the linear or logarithmic units are set in the* ***Display Scale*** *(path: <Menu> / Display / Display Scale).*

***Note**: It is not possible to calibrate the instrument during the execution of the measurements. It is possible to open different lists and sub-lists but the positions in these lists are not displayed inversely and so - not accessible. The "play" icon indicates that the instrument is in the measurement process. In order to change the sensitivity the measurement must be finished!*

4.3.1. Calibration by Sensitivity in the case of acoustic signal

The calibration by the microphone's sensitivity introduction can be conducted in the following way:

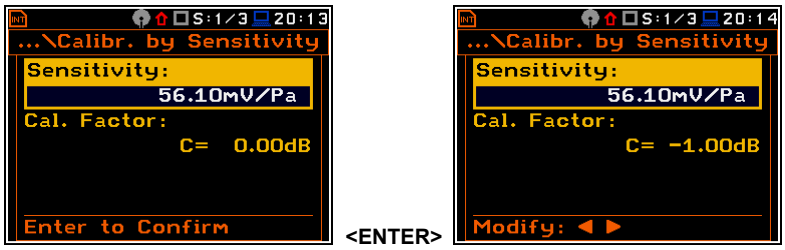
1. Select this type of the calibration (highlight the **Calibr. by Sensitivity** text) from the **Calibration** sub-list and press the **<ENTER>** push-button.



Calibration by sensitivity mode selection

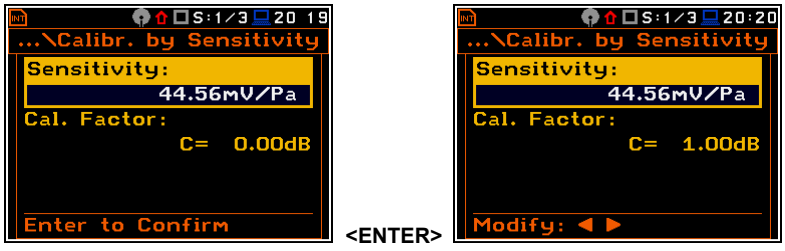
2. Set the sensitivity of the microphone taken from its calibration certificate using the **<Shift>** with **<◀>, <▶>** push-buttons and then press **<ENTER>.**

The calibration factor is calculated, after pressing the **<ENTER>** push-button, in the relation to 50.0 mV / Pa. In order to avoid the calculation the user has to leave the **Calibration** without pressing **<ENTER>**. For the sensitivity of the microphone higher than 50.0 mV / Pa the calibration factor is negative.



Displays during setting the sensitivity higher than 50.0 mV / Pa

For the sensitivity of the microphone lower than 50.0 mV / Pa the calibration factor is positive.



Displays during setting the sensitivity lower than 50.0 mV / Pa

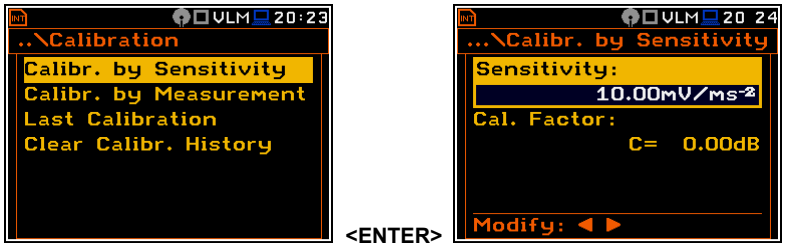
The lowest applicable value of the sensitivity to be introduced is equal to 50.0 μV / Pa (it conforms to the calibration factor equal to 60.0 dB) and the highest one – 50.0 V / Pa (calibration factor equal to -60.0 dB).

In order to return to the **Calibration** sub-list the user has to press the **<ESC>** push-button.

4.3.2. Calibration by Sensitivity in the case of Vibration signal

The calibration by the accelerometer's sensitivity introduction can be conducted in the following way:

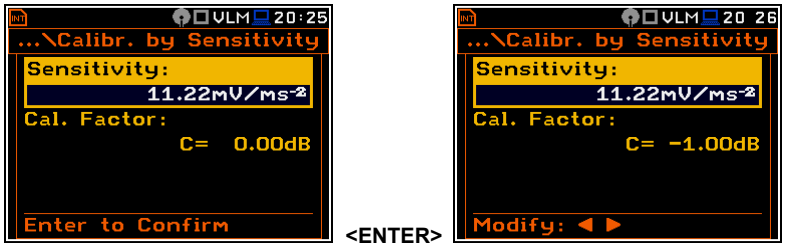
1. Select this type of the calibration (highlight the **Calibr. by Sensitivity** text) from the **Calibration** sub-list and press the **<ENTER>** push-button.



Displays with the selected calibration mode and after entering this mode

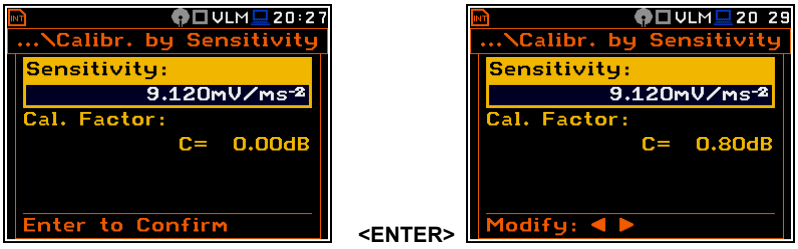
2. Set the sensitivity of the accelerometer taken from its calibration certificate using the **<Shift>** with **< ◀ >**, **< ▶ >** push-buttons and then press **<ENTER>**.

The calibration factor is calculated, after pressing the **<ENTER>** push-button, in the relation to 10.0 mV / ms^{-2}. In order to avoid the calculation the user has to leave the **Calibration** without pressing **<ENTER>**. For the sensitivity of the accelerometer higher than 10.0 mV / ms^{-2} the calibration factor is negative.



Displays during setting the sensitivity higher than 10.0 mV / ms^{-2}

For the sensitivity of the accelerometer lower than 10.0 mV / ms^{-2} the calibration factor is positive.



Displays during setting the sensitivity lower than 10.0 mV / ms^{-2}

The lowest applicable value of the sensitivity to be introduced is equal to 10.0 μV / ms^{-2} (it conforms to the calibration factor equal to 60.0 dB) and the highest one – 10.0 V / ms^{-2} (calibration factor equal to -60.0 dB).

4.3.3. Calibration By Measurement in the case of acoustic signal

The calibration for the sound measurements can be done in the following way:

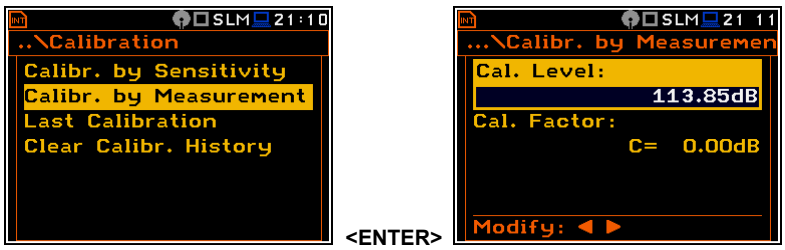
1. Select the calibration by measurement (highlight the **Calibr. by Measurement** text) from the **Calibration** sub-list and press the **<ENTER>** push-button.

2. Attach the acoustic calibrator SV 30A (or equivalent **114 dB / 1000 Hz**) to the microphone of the instrument.

> ***Notice:*** *It is also possible to use the pistonphone, which generates the signal ca 124 dB or different type of acoustic calibrator dedicated for ½" microphones. In any case, before starting the calibration measurement, the user has to set the level of the signal generated by the given calibrator (**Cal. Level** position of **Calibr. by Measurement** sub-list), which is usually stated in the calibration certificate of the unit (the value of the **Cal. Level** set by the producer of SVAN 979 is equal to 114 dB).*

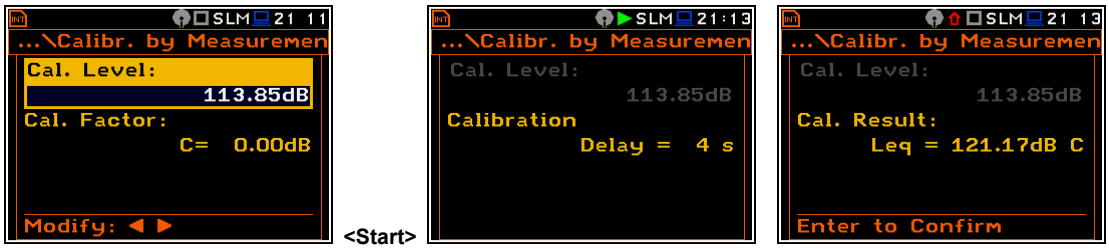
3. Switch on the calibrator and wait ca 30 seconds before starting the calibration measurement.

4. Start the calibration measurement by pressing the **<Start/Stop>** push-button.



Entering the Calibr. by Measurement mode

The measurement time is set to 5 seconds with 5 seconds delay. During the calibration measurement the **<ESC>** and **<Pause>** push-buttons do not operate but it is possible to stop the measurement using the **<Start/Stop>** one. It is not recommended to stop the calibration measurement before programmed 5 seconds period!



Displays during the calibration measurement

Waiting for the start of the measurements the **Start Delay** is counted down on the display. After the end of the measurement, its result is displayed on the display in the bottom line.

It is recommended to repeat the calibration measurement few times. The obtained results should be almost the same (with ±0.1 dB difference). The reasons for the unstable results are as follows:

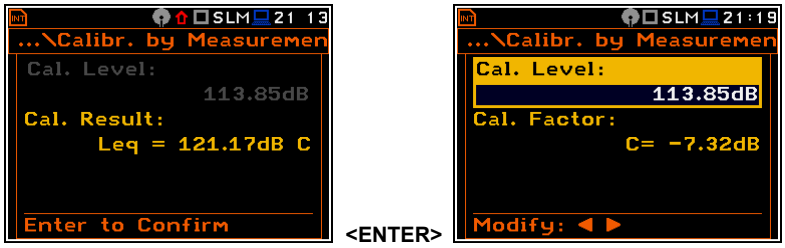
- the calibrator is not properly attached to the instrument,
- there are external disturbances,
- the calibrator or the measurement channel (the microphone, the preamplifier or the instrument itself) are damaged.

Notice: *During the calibration measurement, the external disturbances (acoustic noise or vibrations) should not exceed the value of 100 dB.*

5. Press the **<ENTER>** push-button in order to accept the measurement result.

The calibration factor is calculated, stored and displayed (cf. next Figure) after pressing the **<ENTER>** push-button.

Notice: *The user has to press the* ***<ESC>*** *push-button in order to quit the calibration procedure without saving the calibration factor.*

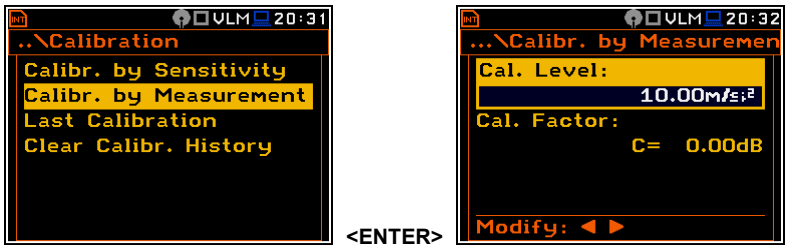


Acceptance of the calibration factor value

4.3.4. Calibration By Measurement in the case of vibration signal

The calibration by measurements can be conducted in the following way:

1. Select the calibration by measurement (highlight the **Calibr. by Measurement** text) from the **Calibration** sub-list and press the **<ENTER>** push-button.



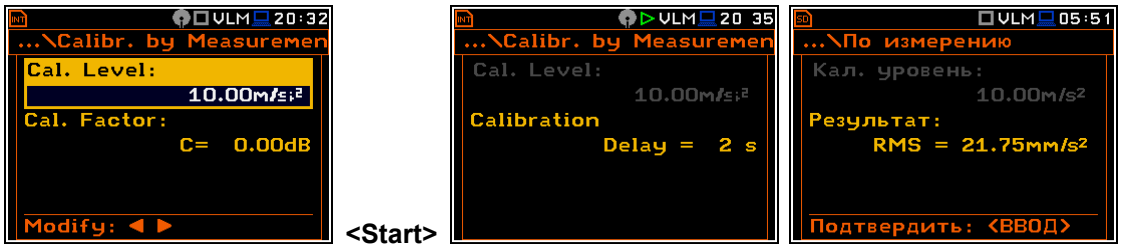
Entering the Calibr. by Measurement mode

2. Attach the vibration calibrator to the instrument's accelerometer.

3. Switch on the calibrator and wait approximately 30 seconds before starting the calibration measurement.

4. Start the calibration measurement by pressing the **<Start/Stop>** push-button.

The measurement starts after 5 seconds delay. The measurement time is also predefined to 5 seconds. During the calibration period, the **<ESC>** and **<Pause>** push-buttons do not operate but it is possible to stop the measurement using the **<Start/Stop>** push-button. Waiting for the calibration measurement to begin, a **Start Delay** is counted down. At the end of the measurement, the result is displayed on the display in the bottom line.



Displays during the calibration measurement

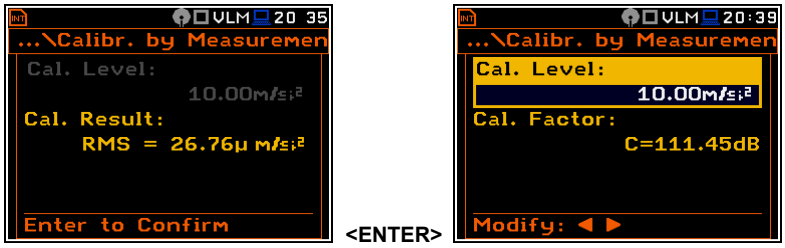
The calibration procedure should be repeated a few times to ensure the integrity of the calibration. The obtained results should be almost identical (with ±0.1 dB difference). The reasons for unstable results are as follows:

- the calibrator is not properly attached to the instrument,
- there are external disturbances,
- the calibrator or the measurement channel (the accelerometer or the instrument itself) are damaged.

Note: *During the calibration period, external disturbances (vibrations or acoustic noise) should not exceed 100 dB.*

5. Press the **<ENTER>** push-button in order to accept the measurement result.

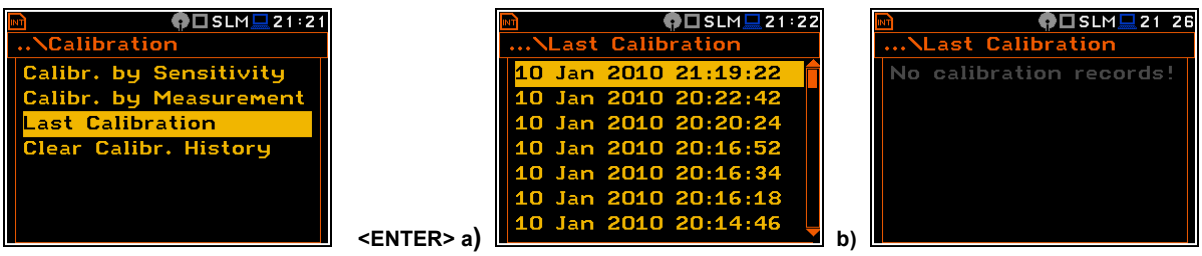
The calibration factor is calculated, stored and displayed after pressing the **<ENTER>** push-button.



Acceptance of the calibration factor value

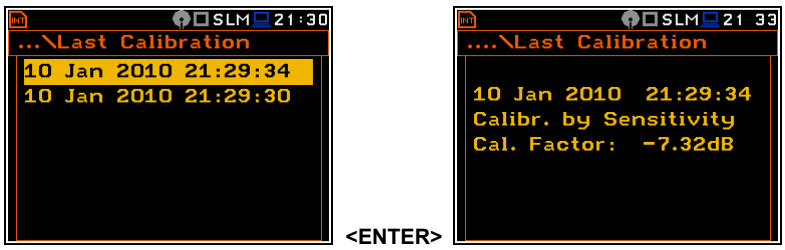
4.3.5. History of the calibrations - Last Calibration

The **Last Calibration** window displays up to ten last calibration records.



Opening the Last Calibration window with calibration records (a) and without (b)

In order to review the calibration record, the user has to select the required line in the **Last Calibration** window and press **<ENTER>**. The opened window contains the date and time of the performed calibration measurement, the way the calibration was done (**Calibr. by Measurement** or **Calibr. by Sensitivity**), the desired calibration level (**Cal. Level**) in the case of the measurements and the obtained calibration factor (**Cal. Factor**).



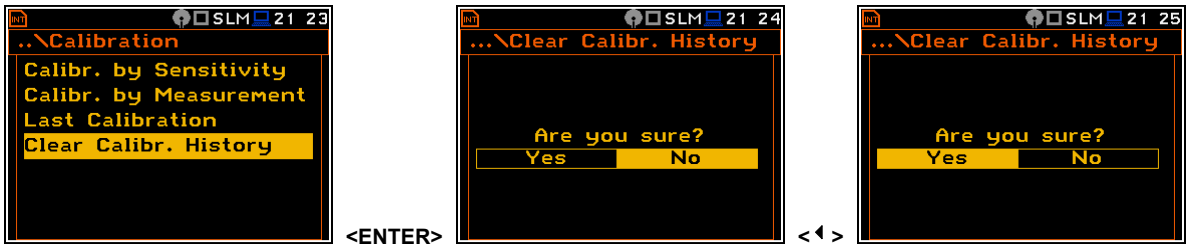
Displays with the Last Calibration records

In the case when the calibration measurements were not performed, the **Last Calibration** window does not contain any record. The content of this window is cleared after the **Factory Settings** operation.

4.3.6. Clear calibration records - Clear Calibr. History

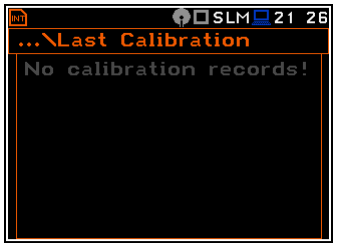
The user can clear all calibrations records. In order to do this the user has to choose the position **Clear Calibr. History** in the **Calibration** sub-list and press **<ENTER>**.

The instrument requests the confirmation of the operation. The next pressing of the **<ENTER>** push-button, when the **No** option is selected, causes the closing of the window and the return to the **Calibration** sub-list.



Entering the Clear Calibr. History window

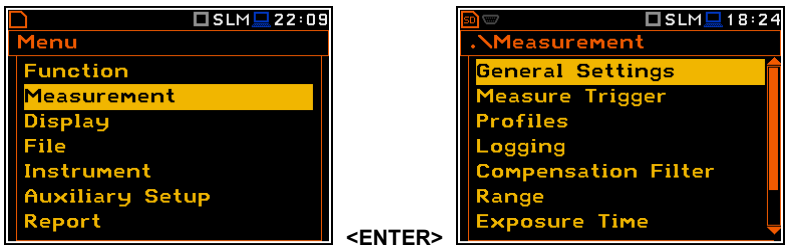
When there is no any calibration record the message **No calibration records!** appears and after pressing any button the instrument returns to the **Calibration** sub-list.



Display with the empty Last Calibration window

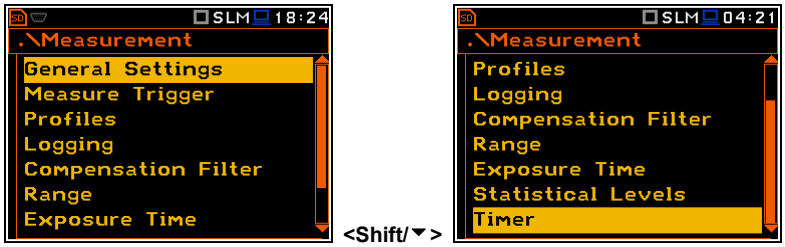
5. MEASUREMENT PARAMETERS SETTING – Measurement

The **Measurement** list contains the elements that enable one the independent programming of the measurement parameters. In order to open the **Measurement** list the user has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**.

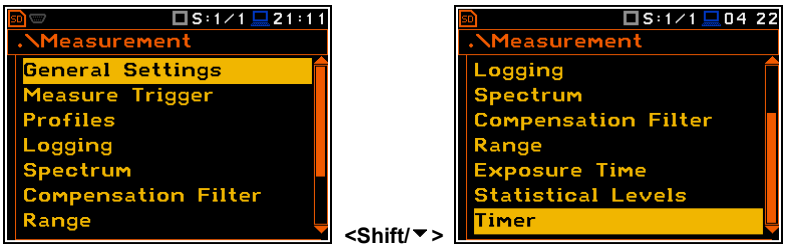


Main list; Measurement window opening

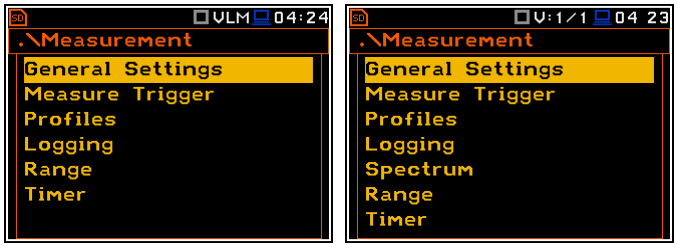
The **Measurement** list is different for different **Mode** and **Measurement Function** and other settings. Below the displays for different modes and measurement functions are presented.



Measurement displays for Level Meter function and Sound Meter mode



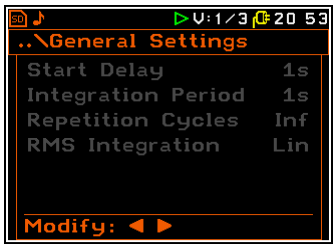
Measurement displays for 1/1 Octave



Measurement list displays for Level Meter, 1/1 Octave and 1/3 Octave function and Vibration Meter mode

The **Measurement** lists for **Direct Sound** and **Direct Vibration** modes are identical to **Sound Meter** and **Vibration Meter** modes accordingly.

Notice: *Any parameter in the* ***Measurement*** *list can be changed only when the instrument does not execute a measurement. The parameters are displayed with different colour and any marker movement is impossible. The blinking "play" icon indicates that the instrument is performing the measurements.*

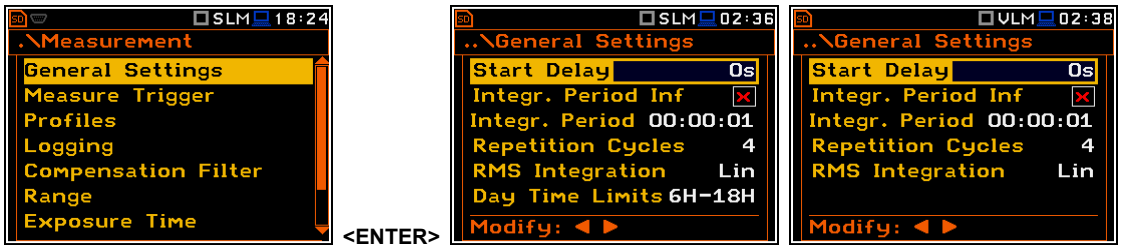


Display with not active parameters of General Settings list during measurement

Notice: *In Vibration modes the parameters can be presented in* ***Logarithmic*** *(decibels) or* ***Linear*** *(m/s^2) units. It depends on the* ***Display Scale*** *position (path: <Menu> / Display / Display Setup / Display Scale / Log or Lin), e.g. 1 0 m/s^2 can be presented as 140 dB.*

5.1 Selection of measurement parameters - General Settings

The **General Settings** list is opened after the selection of the **General Settings** text from the **Measurement** list.

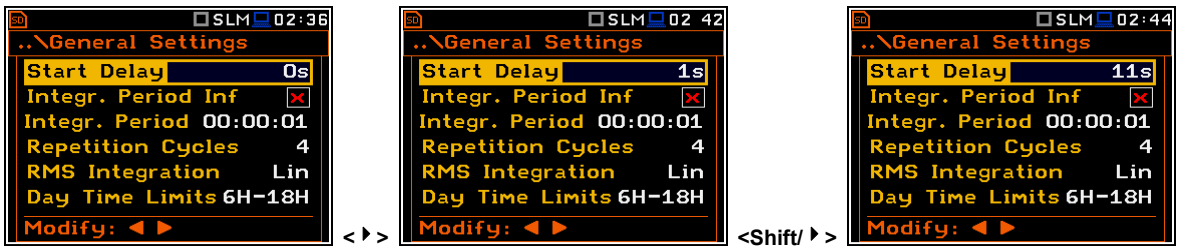


Displays with the General Settings list for Sound and Vibration modes

The **General Settings** consists of the parameters: the delay of the start of measurements (**Start Delay**), the integration period (**Integration Period**), the repetition of the measurement cycles (**Repetition Cycles**), the RMS detector type (**RMS Integration**) and the intervals for day time period (**Day Time Limits**) in case of Sound modes.

Setting time delay before the start of measurements - **Start Delay**

The **Start Delay** defines the delay period from the **<Start/Stop>** push-button pressing to the start of the measurements (the digital filters of the instrument analyse constantly the input signal even when the measurements are stopped). This delay period can be set from **0 second** to **60 seconds** (with 1 second step by means of the **<◀>**, **<▶>** push-buttons and with 10 seconds step with the **<◀>**, **<▶>** push-buttons pressed together with the **<Shift>** one.

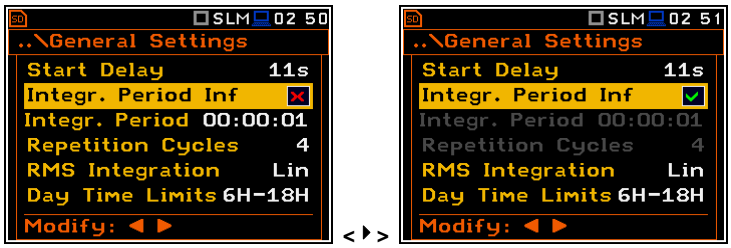


General Settings windows; the setting of the Start Delay with 1-second and 10-second step

Notice: *The minimum delay period is equal to 0 second. In the* ***Calibration*** *mode, the delay period is equal to 5 seconds.*

Switching on/off the integration period settings – **Integr. Period Inf**

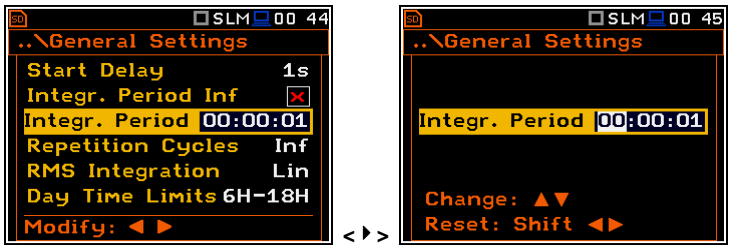
The integration period can be set as infinite or can be defined. The position **Integr. Period Inf** defines if it is infinite or not. If the parameter **Integr. Period Inf** is switched on then the signal will be averaged all the time until **<Stop>** push-button is pressed and the measurement is stopped. If integration period is infinite, then two next positions will be not active.



Integr. Period Inf switching on

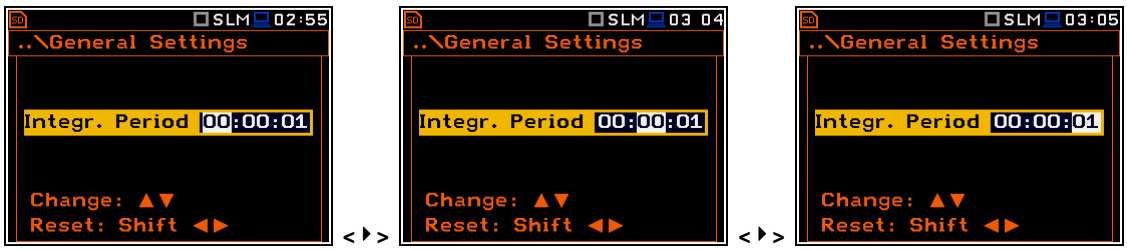
Setting the integration period – **Integr. Period**

The **Integr. Period** defines the period in which the signal is being averaged during the measurements. The measurement will stop automatically after this period, or the measurement will start again in case the **Repetition Cycle** is greater than one. The definitions of the measurement results in which the integration period is used is given in App. D.



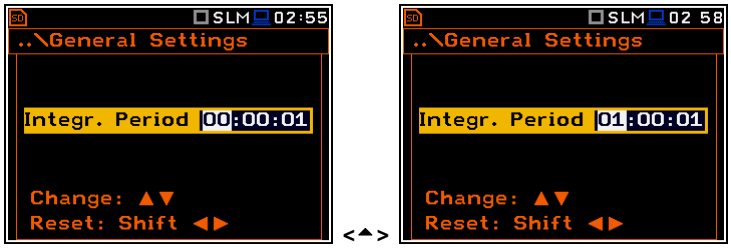
Integr. Period selection

The integration period (**Integr. Period**) can be set in the special window, which is opening by pressing the **< >** or **< >** push- buttons.

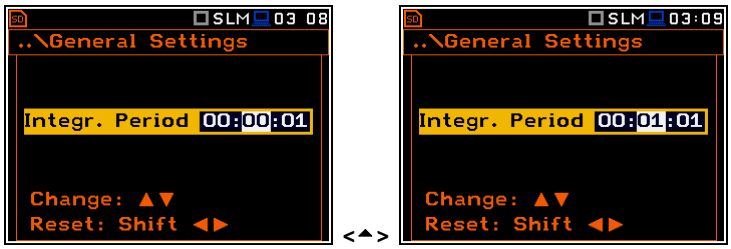


Integr. Period field selection

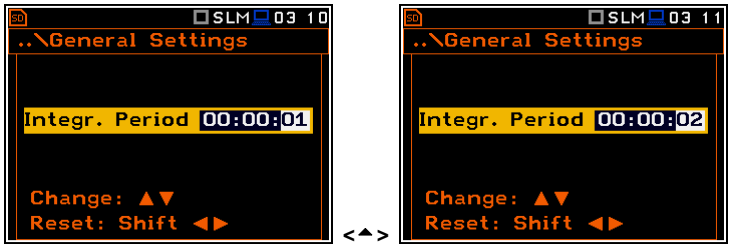
To set the integration period one should define hours, minutes and seconds field. The field may be selected by pressing the **<◄>** or **<►>** push- buttons.



Integr. Period setting; hour selection with 1 and 10 step



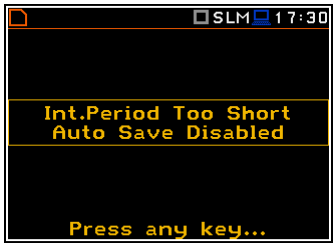
Integr. Period setting; minute selection with 1 and 10 step



Integr. Period setting; second selection with 1 and 10 step

Notice: *In the case of switching on the* ***Auto Save*** *function, the minimum value of the integration period should be equal to 10 seconds.*

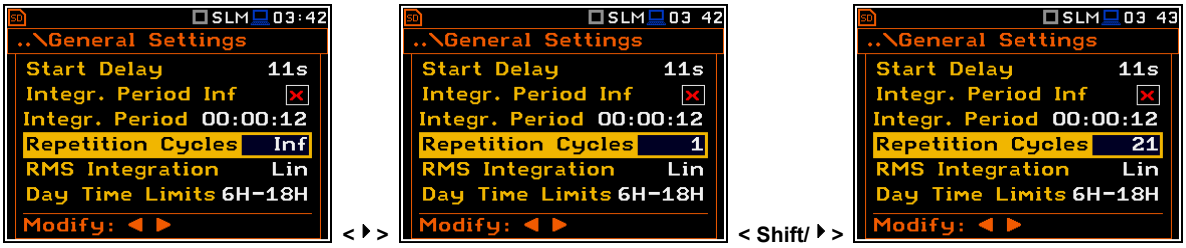
If the user wants to switch on **Auto Save** option *(path: <Menu> / File / Save Options / Auto Save)* the integration period value has to be greater or equal than 10 seconds. When **Auto Save** option was switched on and new entered integration period value is less than 10 seconds **Auto Save** option switches off and **Int. Period Too Short / Auto Save Disabled** message appears on the display.



Display, when the Integration Period is too short for Auto Save option

Setting the number of repetition of measurement cycles - **Repetition Cycles**

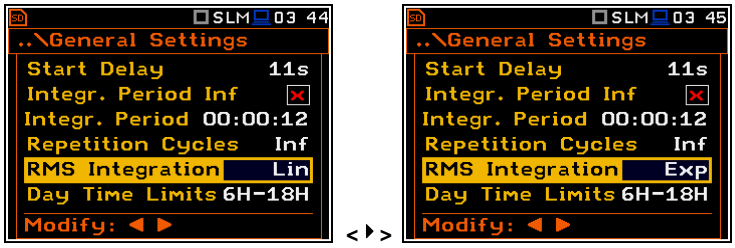
The **Repetition Cycles** defines the number of cycles (with the measurement period defined in the **Integration Period**) to be performed by the instrument. The **Repetition Cycles** number values are within the limits [1, 1000].



Repetition Cycles setting with the step equal to 1 and 20

Detector's type selection - **RMS Integration**

The **RMS Integration** defines the detector type for the calculations of the **Leq**, **Le**, **LEPd**, **Lxx** and **Sel** functions. Two options are available: linear (**Lin**) and exponential (**Exp**).



General Settings windows; setting the RMS Integration parameter

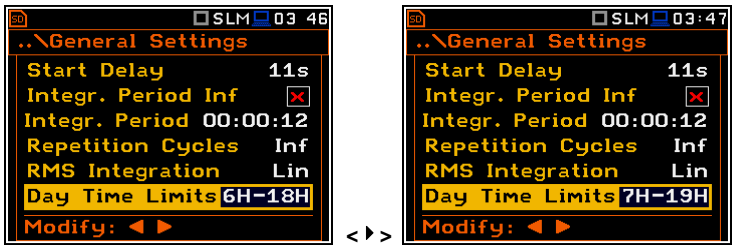
The formulae used for the **Leq** calculation are given in Appendix D.

Setting **Lin** is required for getting the true RMS value of the measured signal. When this option is selected the value of the **Leq**, **Le**, **LEPd**, **Lxx** and **Sel** functions do not depend on the detector time constant: **Fast**, **Slow** or **Impulse** (the results are displayed without the indicator of the detectors selected in the profiles). In this case, the indicator **Lin.** (or **L**) is displayed in the different modes of the result presentation.

Setting **Exp** enables the user to fulfil the requirements of another standard for the **Leq** measurements. When this option is selected the value of the **Leq, Le, LEPd, Lxx** and **Sel** function depends on the detector time constant (the results are displayed with the indicator of the detectors selected in the profiles (*path: <Menu> / Measurement / Profiles*).

Day time limits selection - **Day Time Limits**

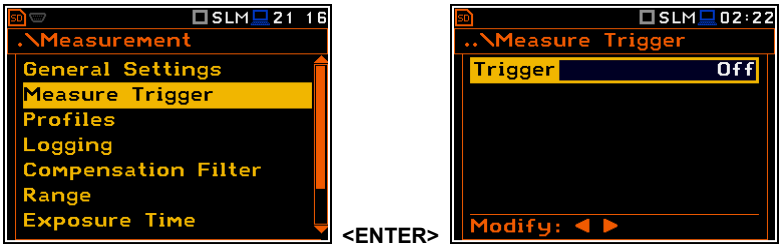
The **Day Time Limits** enables the user to select the required by the local standards definition of the day and night. These limits are used for the calculation of the **Le** function (cf. App. D for the definition).Two options are available: **6H–18H** and **7H–19H**.



General Settings windows; setting the Day Time Limits parameter

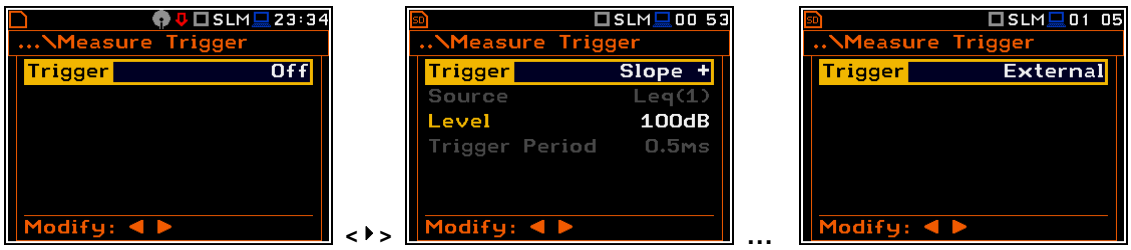
5.2 Measure triggering parameters selection – Measure Trigger

The **Measure Trigger** sub-list enables the user to set the triggering parameters.



Measurement list; Measure Trigger window opening

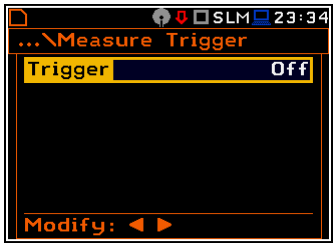
The **Measure Trigger** is a contexts sub-list in which the triggering can be switched off or on (**Trigger**), in the case when on - the source of the triggering signal can be determined (**Source**), its level (**Level**) and sometimes also the speed of changes (**Gradient**).



Measure Trigger windows

Switching the triggering on and off – **Trigger**

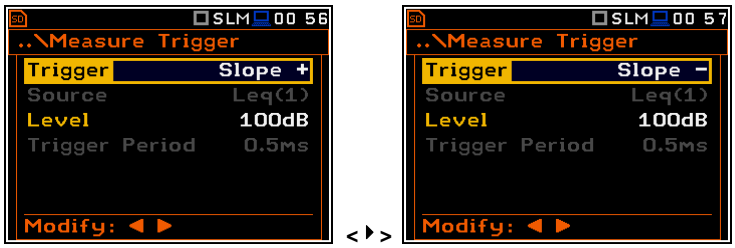
The triggering of the measurements (**Trigger**) can be switched off using the **<Shift>** with **< >** push-buttons.



Measure Trigger window; Trigger switched off

The triggering is switched on if one of its six modes is selected: **Slope +**, **Slope –**, **Level +**, **Level –**, **Grad +** or **External**. If the instrument works with the triggering switched on, the appropriate icon appears on the display in the case when the triggering condition was not fulfilled.

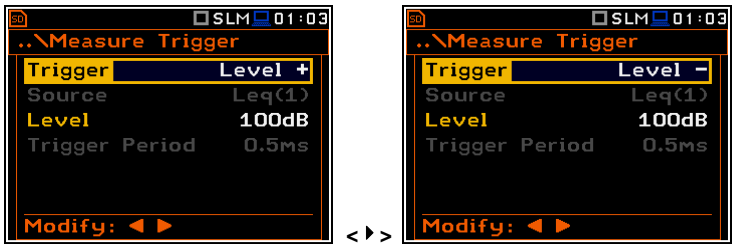
In the case when the **Slope +** is selected, the measurement starts when the arising signal will pass the level determined in the **Level**. In the case when the **Slope –** is selected, the measurement starts when the falling down signal will pass the level determined in the **Level**. The measurement is stopped when the conditions set in the **General Settings** sub-list are fulfilled, after pressing the **<Start/Stop>** push-button or after receiving the proper control code remotely.



Measure Trigger windows with the Slope modes selected

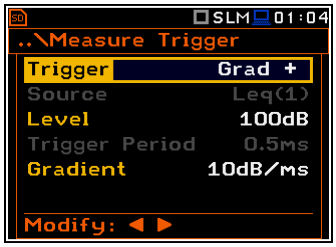
In the case when the **Level +** is selected, in each second of the measurement the triggering condition is checked; the measurement is registered only when the signal has the greater level than this determined in the **Level** and in the other case the measurement result is skipped.

In the case when the **Level –** is selected, in each second of the measurement the triggering condition is checked; the measurement is registered only when the signal has the lower level than this determined in the **Level** and in the other case the measurement result is skipped.



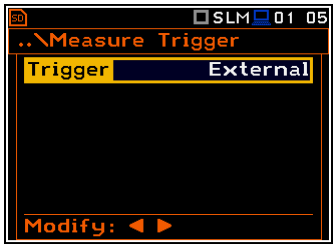
Measure Trigger windows with the Level modes selected

In the case when the **Grad +** is selected, in each second of the measurement the triggering condition is checked; the measurement is registered only when the signal has the greater level than this determined in the **Level** and the gradient of the signal is greater than this determined in the **Gradient** position. In the other case the measurement result is skipped.



Measure Trigger window with the Grad + mode selected

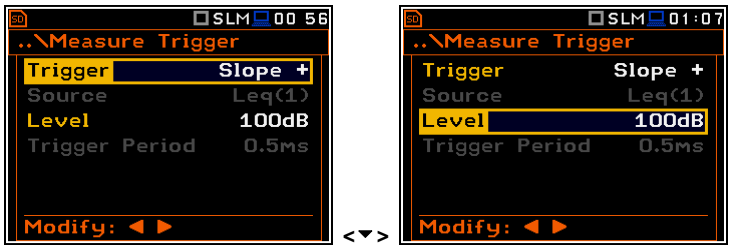
In the case when the **External** is selected the triggering is done by the signal on the **I/O** socket. In this case it is necessary to set up the **I/O Mode** parameter as **Digital In** (*path: <Menu> / Instrument / Multifunction I/O*). In the other case the measurement result is skipped.



Measure Trigger window with the External mode selected

Selection of the triggering signal – **Source**

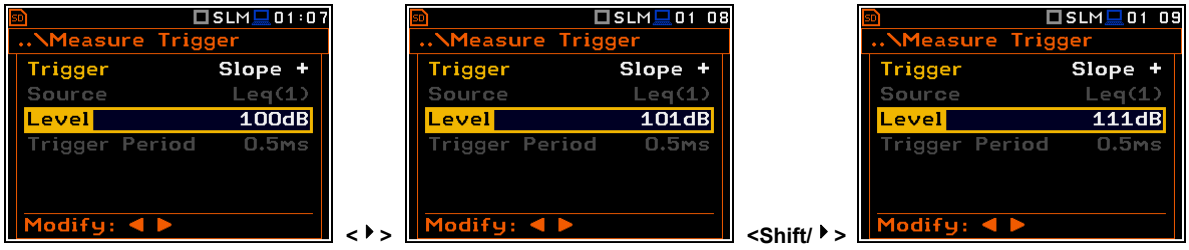
It is assumed that only one measured result can be used as a source of the triggering signal in the **Level Meter** mode, namely the output signal from the RMS detector coming from the first profile which is denoted here as **Leq(1)**. This position does not become active (it is not displayed inversely) and the text stated here remains unchanged. After pressing there the **<▼>** push-button, the **Source** line is skipped.



Measure Trigger windows with not active Source signal line

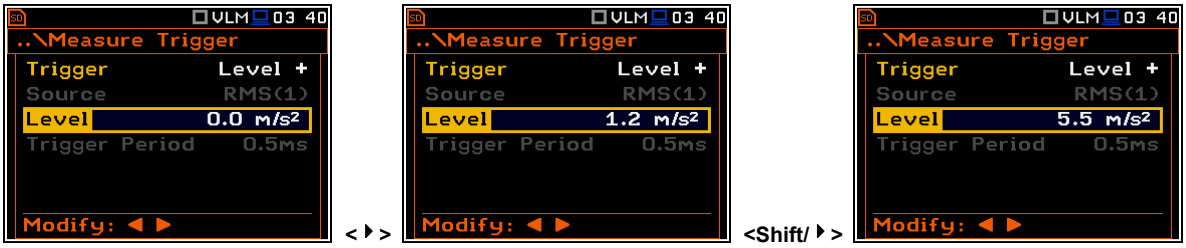
Setting the level of the triggering signal – **Level**

The level of the triggering signal (**Level**) can be set in 1 dB step (or 10 dB steps) from 24 dB to 136 dB range.



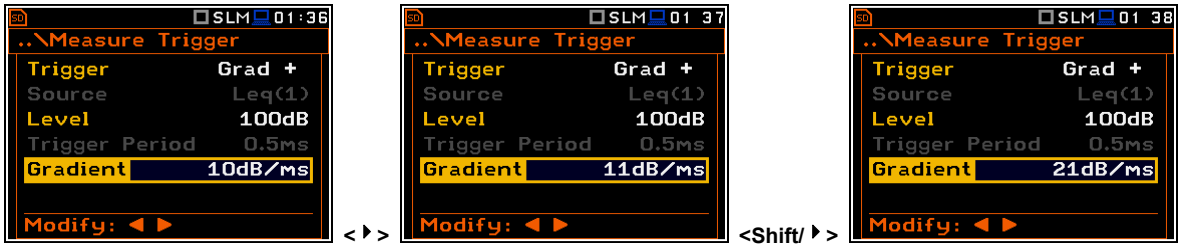
Measure Trigger windows with the Level selection in the Sound Meter mode

Notice: *The **Level** value of the triggering signal refers to the instantaneous value of the RMS result from the first profile calculated during the period depending on selected **Detector** (path: <Menu> / Measurement / Profiles).*



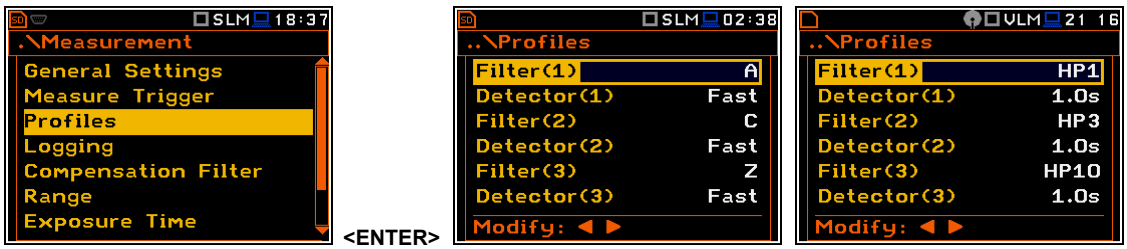
Setting the speed of the triggering signal changes – **Gradient**

This position appears when the **Grad+** trigger is chosen. The speed of the triggering signal changes (**Gradient**) can be set from 1 dB/ms to 100 dB/ms range.



5.3 Setting parameters in a profile – Profiles

The **Profiles** list is opened after the selection of the **Profiles** text from the **Measurement** list.



In the **Profiles** sub-list the following parameters can be programmed independently for each profile: weighting filter (**Filter**) and RMS detector type (**Detector**).

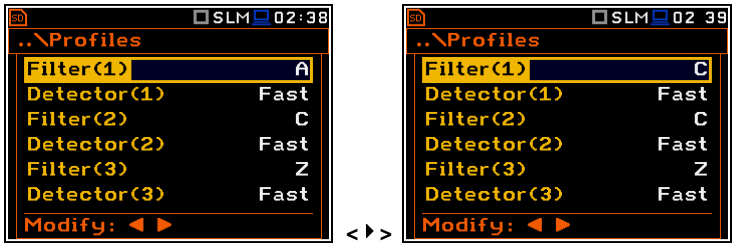
Notice: *The change of the profile parameters is not possible when the measurement is performed. The user has to finish the current measurement.*

Weighting filter selection – **Filter**

The following weighting filters are available in a profile of the instrument:

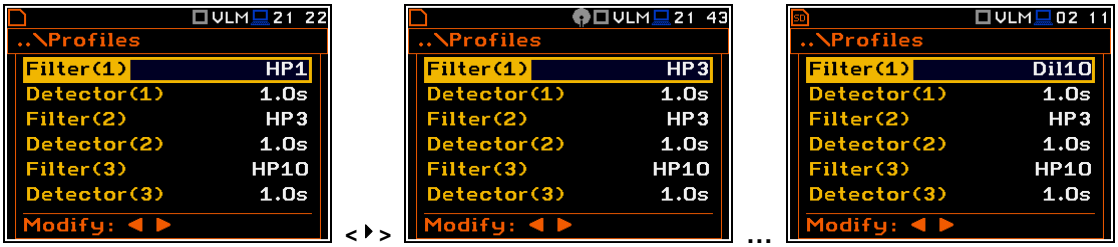
- in the case of sound measurements

- **Z** type 1 according to the IEC 61672-1 standard,
- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **B** type 1 according to the IEC 651 standard,
- **G** according to the ISO 7196:1995 standard.
- **R1**, **R2**, **R3** if the **Real Time Filters** are activated in the **Setup** list *(path: <Menu> / Auxiliary Setup / User Filters / Real Time Filters)*



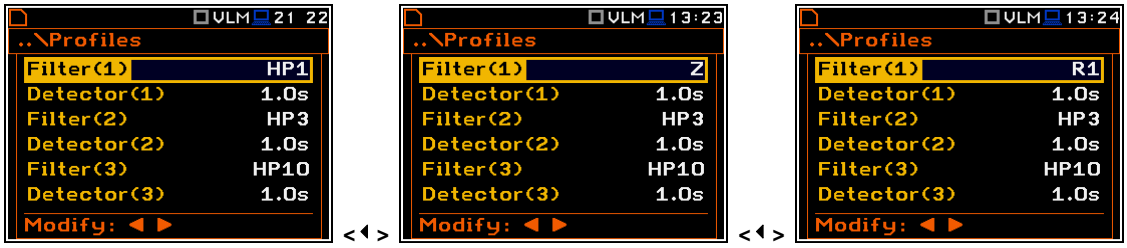
Profiles windows; the selection of the weighting filter in Sound Meter mode

- in the case of acceleration measurements (Vibration): **Z**, **HP1**, **HP3**, **HP10**, **Wh**,
- in the case of velocity measurements (Vibration): **Vel1**, **Vel3**, **Vel10** and **VelMF**,
- in the case of displacement measurements (Vibration): **Dil1**, **Dil3** and **Dil10**.



Profiles windows; the selection of the weighting filter in Vibration Meter mode

- for all types of signal it is possible to use real time filters **R1**, **R2**, **R3** if they are activated in the **Setup** list (*path: <Menu> / Setup / User Filters / Real Time Filters*)



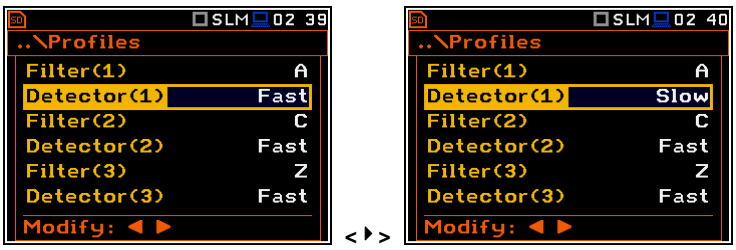
Selection of the R1, R2, R3 weighting filter in Vibration mode

The characteristics of the filters are given in App. D.

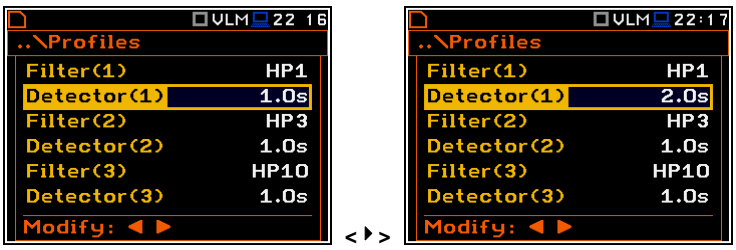
After pressing the **<ENTER>** push-button any changes made in the sub-list are confirmed and it is closed. The return to the **Measurement** list ignoring any changes made in the sub-list is made after pressing the **<ESC>** push-button.

RMS detector selection – **Detector**

In the instrument the following RMS detectors are available: **Impulse**, **Fast** and **Slow** (in the case of sound measurements) and **100ms**, **125ms**, **200ms**, **500ms**, **1.0s**, **2.0s**, **5.0s**, **10.0s** (in the case of Vibration measurements).



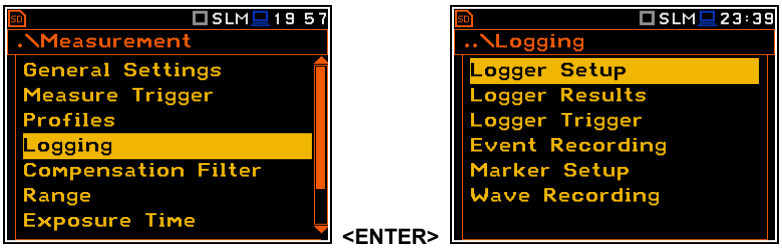
Profiles windows; the selection of the RMS detector in Sound Meter mode



Profiles windows; the selection of the RMS detector in Vibration Meter mode

5.4 Setting of the logging functionality – Logging

The **Logging** list is opened after the selection of the **Logging** text from the **Measurement** list.

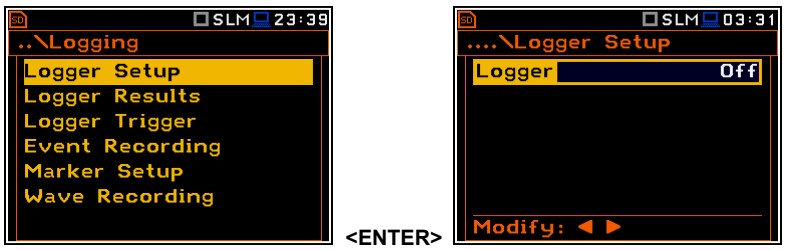


Logging window opening

The **Logging** list consists of six positions: **Logger Setup**, **Logger Results**, **Logger Trigger**, **Event Recording**, **Marker Setup** and **Wave Recording**. The **Logging** list enables the user to program the recording of the measurement history, program the markers and parameters of event or signal (wave) recording.

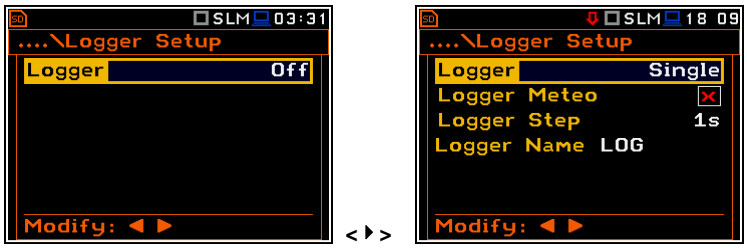
5.4.1 Settings of the Logger – Logger Setup

The **Logger Setup** list enables the user to activate logger functionality and meteo results logging. It also allows to edit the name of the logger file and to set logger step.



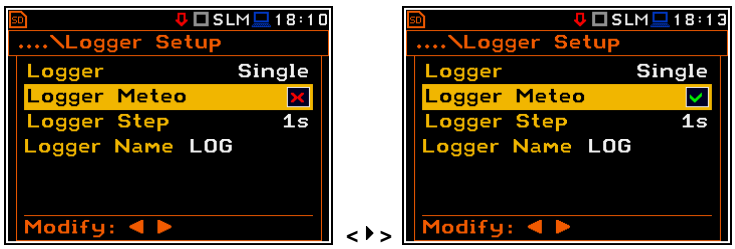
Logger Setup list opening

The **Logger** switches on and off the functionality, which enables the user to save in a file the selected results from three profiles with the defined period.



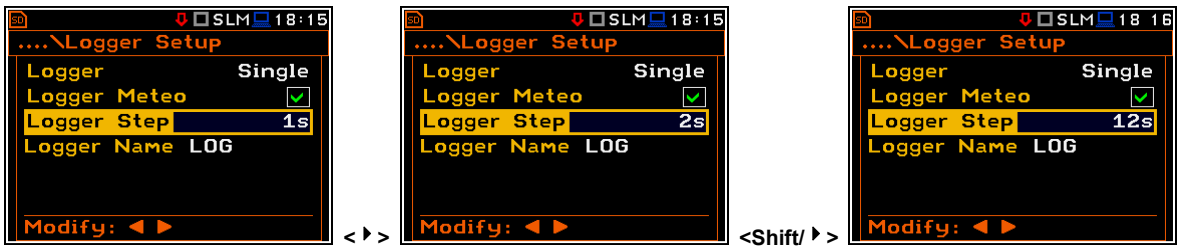
Displays with the Logger activation

The **Logger Meteo** switches on (☑) and off (☒) the saving in a file the meteorological results from the Monitoring Station.



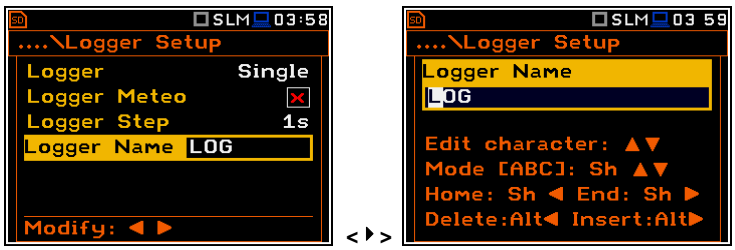
Logger Meteo activation

The **Logger Step** defines the period of the data logging in a file. It can be set from 2 milliseconds to 1 second in 1, 2, 5 sequence, the values from 1 second to 59 seconds, the values from 1 minute to 59 minute and 1 hour.



Logger Step settings

The **Logger Name** enables the user to name the logger file. The default one is **LOG**. The name cannot be longer than eight characters. After pressing the **< >**, **< >** push-buttons, the special window with text editor function is opening.



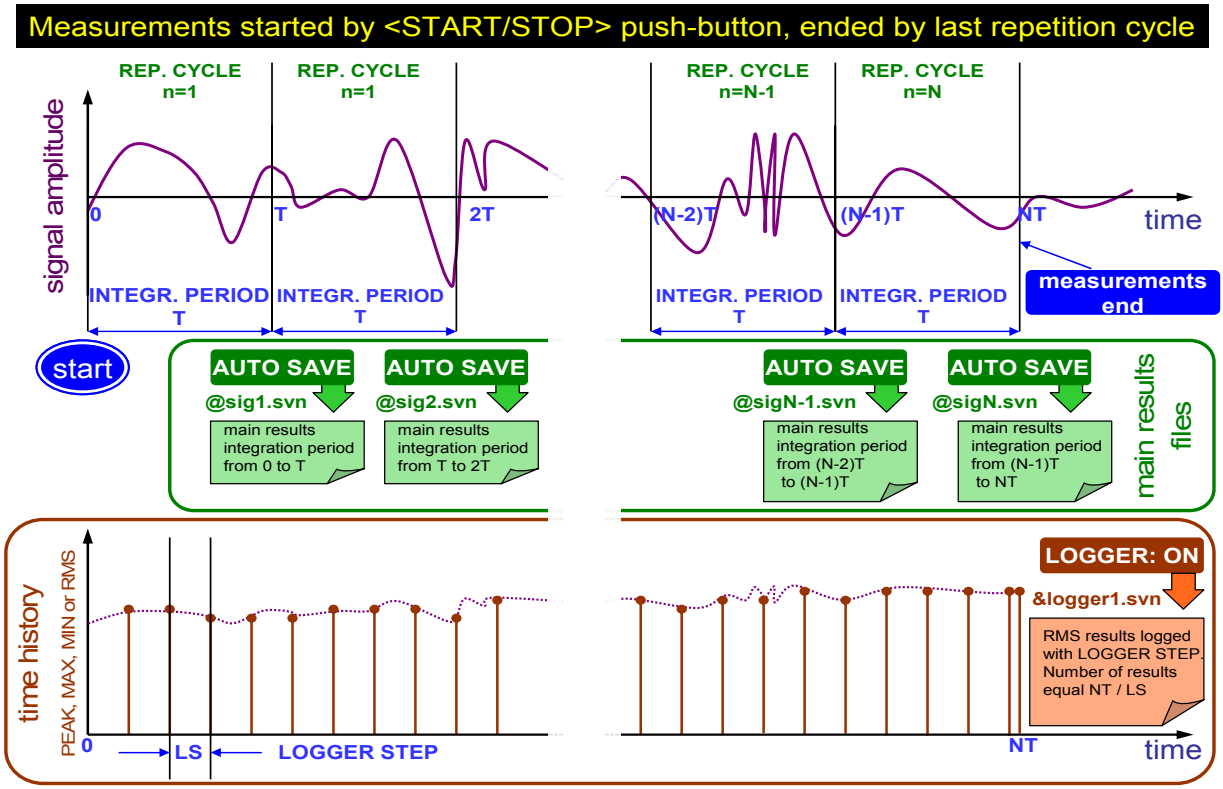
Logger Name edition in Logger Setup window

The edited name is accepted after pressing the **<ENTER>** push-button. The special warning is displayed in the case the file with the edited name already exists in the memory. The instrument waits then for a reaction of the user (any push-button should be pressed except the **<Shift>** or the **<Alt>** one).

Displays during the attempt of overwriting the existing file

The main measurement results (cf. App. B) are calculated in the period set in the **Integration Period**. These results can be saved in the result files of the instrument's memory by means of the **Save** or **Save Next** function (*path: <Menu> / File / File Manager*). In the case the **Integration Period** is greater than 9 seconds, it can be done also by means of the **Auto Save** operation. The name of the file for that operation is set in the **File Name** position (*path: Menu / File / Save Options / File Name*), which appears when **Auto Save** parameter is switched on. In the case the **Repetition Cycles** is greater than one, the **Auto Save** operation will be performed after the period set in the **Integration Period**. The name of the file with the main results is changed after each saving (file name number increases by one).

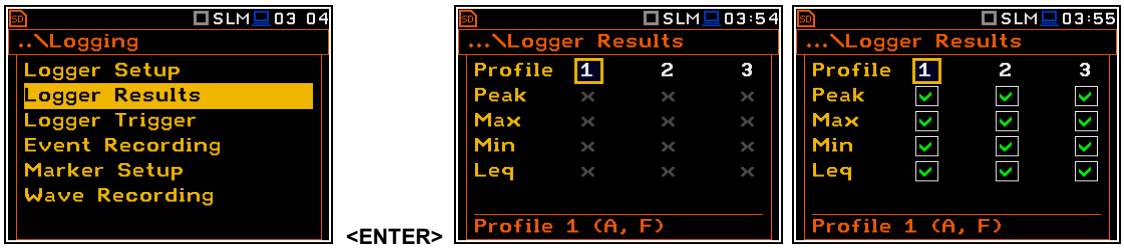
In the same, when the **Logger** is switch on, the partial measurement results are calculated in the period set in the **Logger Step** and saved in the logger file Up to 12 results can be logged simultaneously from three independent profiles of the instrument (**Peak** / **Max** / **Min** / **RMS** for sound measurements or **Peak**/ **P–P**/ **Max**/ **RMS** for Vibration measurements) with time step down to 2 ms. These results are saved in the logger file in the external memory in all modes and functions of the instrument. The registration in the logger's memory is stopped after the period, which is equal to **Integration Period** multiplied by **Repetition Cycles**, after pressing the **<Start/Stop>** push-button or after stopping the measurements remotely.



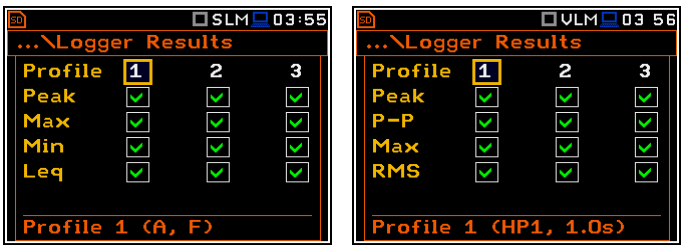
Relations between Integration Period and Logger Step

5.4.2 Results selection – Logger Results

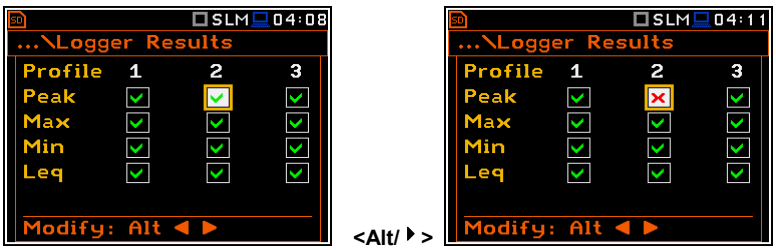
The **Logger Results** list enables the user to activate the results for three profiles, which will be recorded to the logger file during measurement. Activation / deactivation can be done by means of the **<◄>**, **<►>** push-buttons pressed together with the **<Alt>** one. The position is changed by means of **<◄>**, **<►>** and **<▲>**, **<▼>** push-buttons.



Logger Results list opening when Logger function is switched off and on for Sound Modes

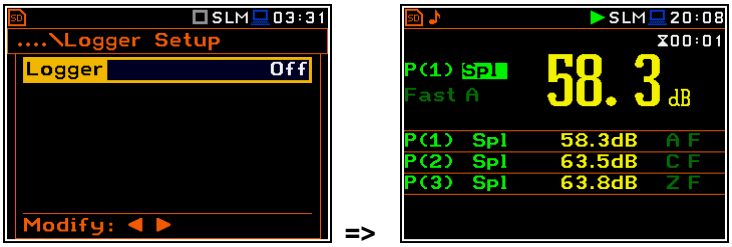


Logger Results list for Sound and Vibration modes



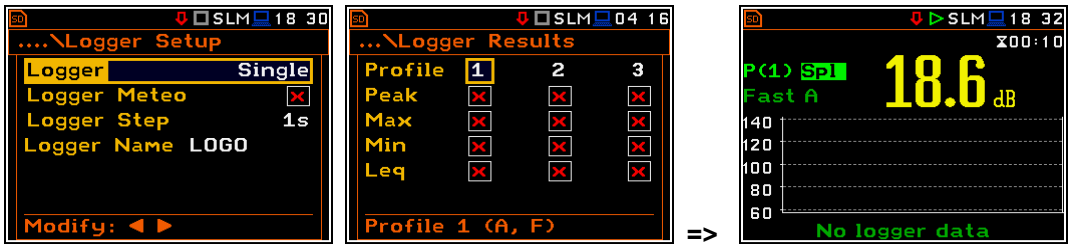
Logger Results list; Peak result for the second profile deactivation

When **Logger** is switched off the screen in one profile visualisation mode is like below.



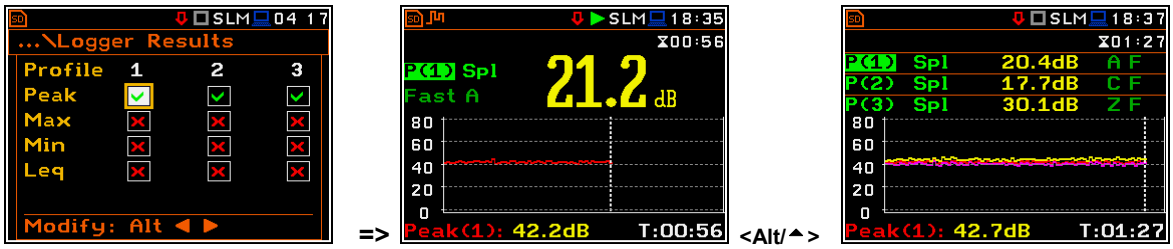
Result display with not active Logger

When **Logger** is switched on and there is no results selected for logging the screen in one profile visualisation mode is like below.



Result display with active Logger and without selected results

When **Logger** is switched on and there are results selected for logging the screen in one profile visualisation mode is like below.

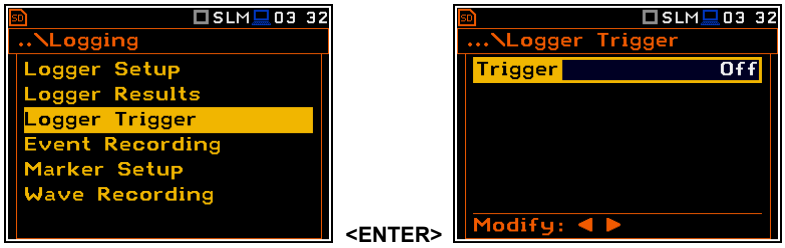


Result display with active Logger and with selected results

5.4.3 Logger trigger parameters setup – Logger Trigger

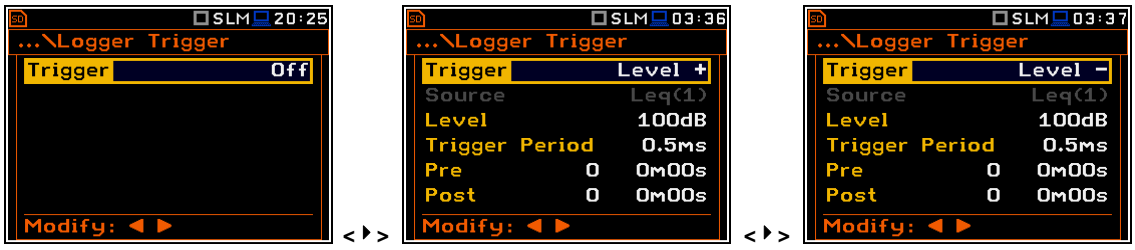
The **Logger Trigger** parameters influence the way the measurement results are saved in the logger. It is a contexts sub-list in which: the trigger can be switched off or it's type selected (**Trigger**), the source of the triggering signal can be determined (**Source**), it's level can be selected (**Level**), the number of the results saved in the logger before the fulfilment of the triggering condition (**Pre**) and the number of the results saved in the logger after the fulfilment of the triggering condition (**Post**). If the triggering signal is greater than the selected in the **Level +** or less than **Level -**, the logger contains:

- the measurement results registered directly before the fulfilment of the triggering condition; time of the registration can be calculated by multiplying the value set in the **Pre** by the time period taken from the **Logger Step** (*path: <Menu> / Measurement / Logging / Logger Setup*);
- all measurement results up to the moment the triggering signal falls down the **Level**;
- the results registered directly after the fulfilment of the triggering condition; time of the registration can be calculated by multiplying the value set in the **Post** by the time period taken from the **Logger Step** (*path: <Menu> / Measurement / Logging / Logger Setup*).



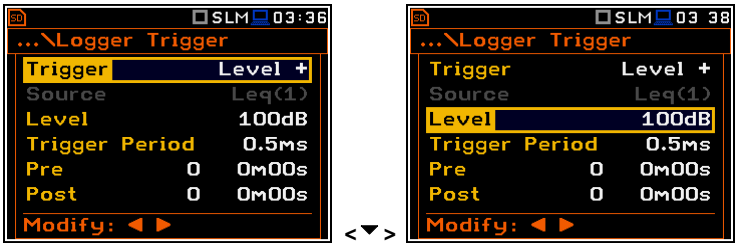
Logger Trigger list opening

The logger triggering of the measurements (**Trigger**) can be switched off using the **<◄>** push-button. The triggering is switched on if the **Level +** or **Level –** mode is selected using the **<►>** push-button.



Logger Setup windows (Sound modes)

When **Level Meter** mode is chosen the only one measured result can be used as a source of the triggering signal in the logger, namely the output signal from the RMS detector coming from the first profile which is denoted here as **Leq(1)**. This position does not become active (it is not displayed inversely) and the text stated here remains unchanged. After pressing the **<▼>** push-button, the **Source** line is skipped.

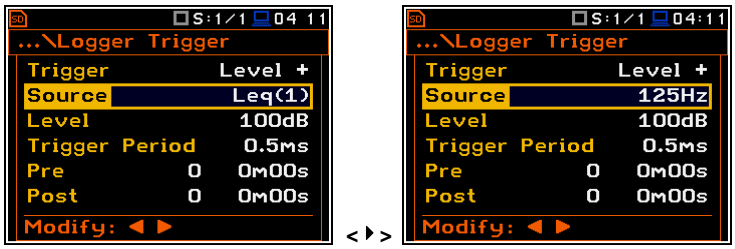


Logger Trigger windows with not active Source signal line (Sound modes)

When **1/1 Octave** or **1/3 Octave** mode is chosen it is possible to use as a source of the triggering signal in the logger also RMS band-pass value of 1/1 octave or 1/3 octave spectrum filters with appropriate central frequency.

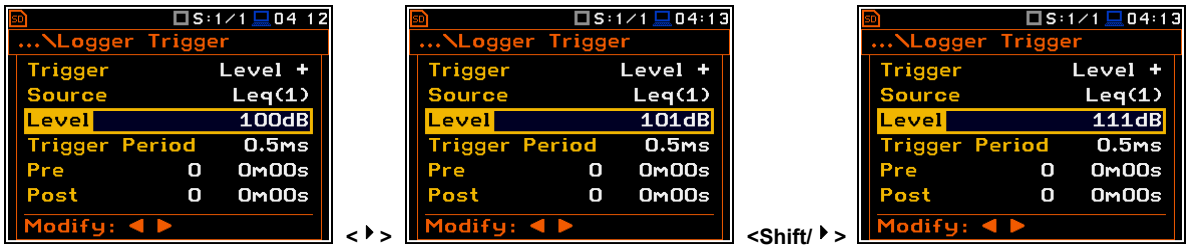
Available values of **Source** parameter for **1/1 Octave** mode: **Leq (1)**, **250Hz**, **500Hz**, **1.00kHz**, **2.00kHz**, **4.00kHz**, **8.00kHz**, **16.0kHz**.

Available values of **Source** parameter for **1/1 Octave** mode: **Leq (1)**, **125Hz**, **160Hz**, **200Hz**, **250Hz**, **315Hz**, **400Hz**, **500Hz**, **630Hz**, **800Hz**, **1.00kHz**, **1.25kHz**, **1.60kHz**, **2.00kHz**, **2.50kHz**, **3.15kHz**, **4.00kHz**, **5.00kHz**, **6.30kHz**, **8.00kHz**, **10.0kHz**, **12.5kHz**, **16.0kHz**, **20.0kHz**.

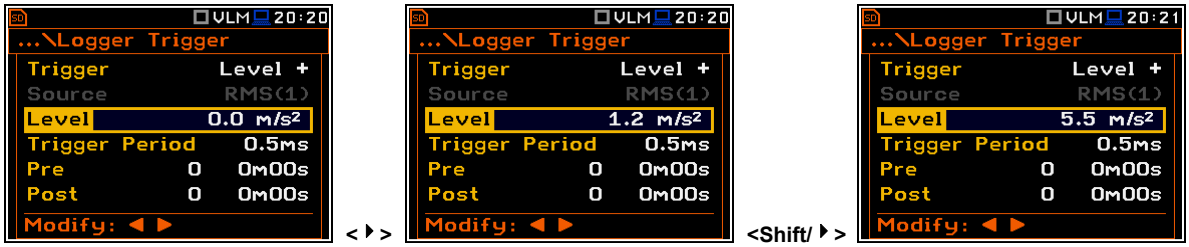


Logger Trigger windows with the active Source signal line (1/1 Octave mode)

The level of the triggering signal in logger (**Level**) can be set in sound modes in 1 dB step from 24 dB to 136 dB range and in vibration modes from 1.00 mm/s^2 to 10.0 km/ s^2.

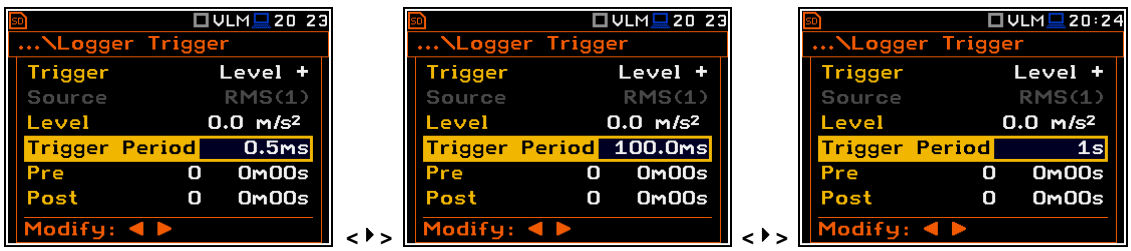


Logger Trigger windows with the Level selection (Sound modes)



Logger Trigger windows with the Level selection (Vibration modes)

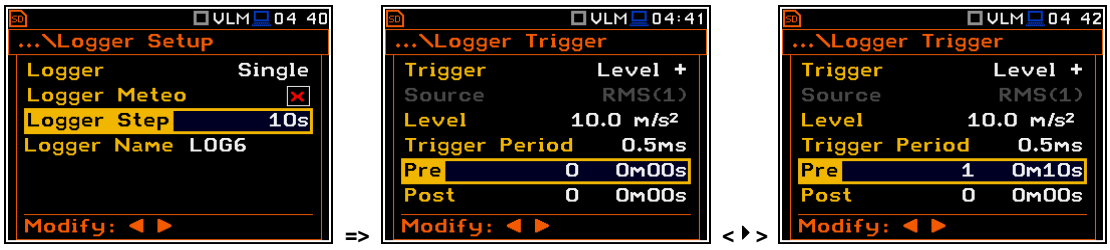
Notice: *The **Level** value of the triggering signal in logger refers to the instantaneous value of the RMS result from the first profile calculated during the period depending on selected **Detector (1)** (path: <Menu> / Measurement / Profiles).*



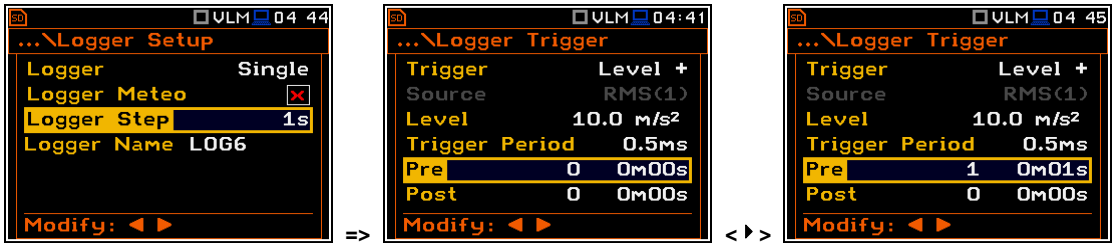
Logger Trigger windows with the Trigger Period selection

In the **Pre** line the number of the results registered in the logger's file before the fulfilment of the triggering condition can be set. This number is within the limits 0..50.

The period of the measurements that are saved in the logger before the fulfilment of the triggering condition can be calculated multiplying the value set in the **Pre** by the value set in the **Logger Step** (*path: <Menu> / Measurement / Logging / Logger Setup*). The result of the calculation is presented in the same line, at the right side of the display.



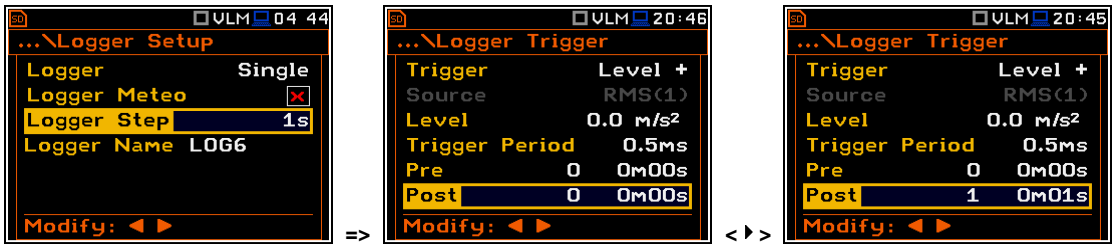
Logger Trigger windows with the Pre selection with Logger Step equal to 10 s (Vibration modes)



Logger Trigger windows with the Pre selection with Logger Step equal to 1 s (Vibration modes)

In the **Post** line the number of the results registered in the logger's file after the fulfilment of the triggering condition can be set. This number is within the limits 0..200.

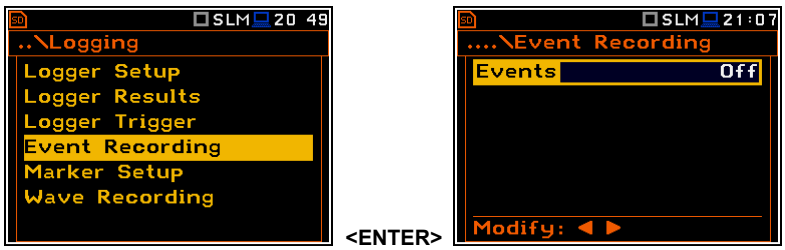
The period of the measurements that are saved in the logger after the fulfilment of the triggering condition can be calculated multiplying the value set in the **Post** by the value set in the **Logger Step** (*path: Menu / Measurement / General Settings*). The result of the calculation is presented in the same line, at the right side of the display.



Logger Trigger windows with the Post selection with Logger Step equal to 1 s (Vibration modes)

5.4.4 Event recording setup – Event Recording

The **Event Recording** position enables the user to activate and to set the parameters of event signal recording on the external memory (**SD Card** or **USB Disk**).



Event Recording list opening

The **Events** position, if it is not **Off**, defines the type of events recording: **Continuous** or **On Trigger**.

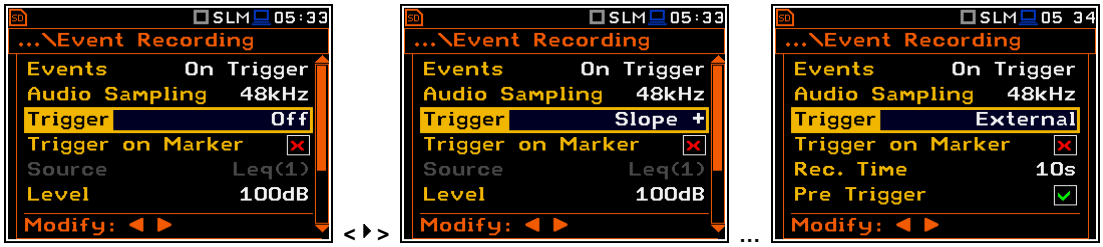
Events parameter selection

The **Audio Sampling** position enables the user to select the sampling frequency of event recording: **12KHz**, **24kHz** and **48kHz**.

Audio Sampling parameter selection

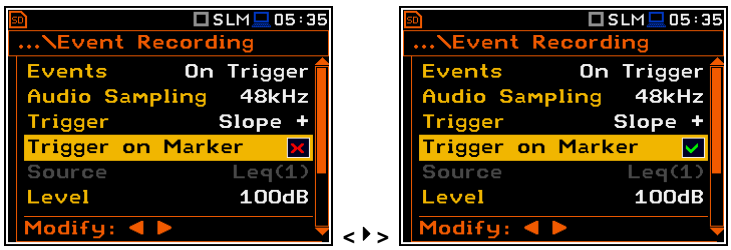
When **On Trigger** event recording is chosen then additional positions appears which enables one to programme the trigger conditions for the event recording.

In the **Trigger** position following options are available: **Off**, **Slope +**, **Slope –**, **Level +**, **Level –** and **External**.



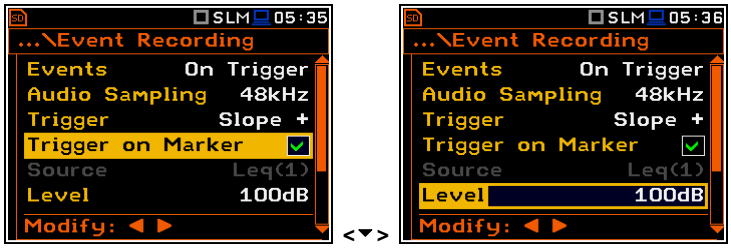
Trigger parameter selection

The **Trigger on Marker** position switches on or off the triggering by marker setting.



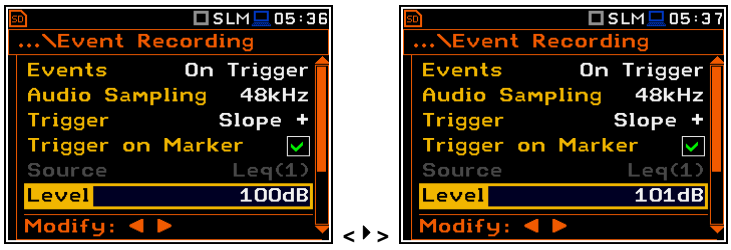
Trigger on Marker parameter selection

The **Source** position only informs about the source signal. Only one measured result can be used as a source of the triggering signal in all modes, namely the output signal from the RMS detector coming from the first profile which is denoted here as **RMS(1)**. This position does not become active (it is not displayed inversely) and the text stated here remains unchanged. After pressing the **<▼>** push-button, the **Source** line is skipped.

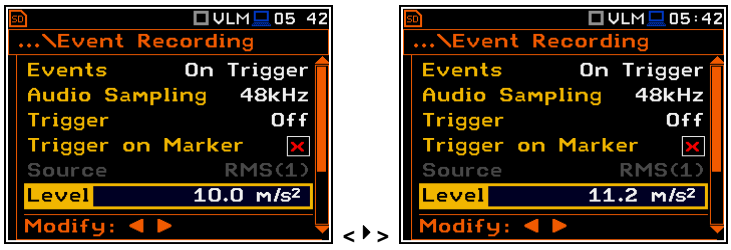


Event Recording windows with the not active Source position

The level of the triggering signal for recording (**Level**) can be set in a range from 24 dB to 136 dB with the 1 dB step. In the case of Vibration measurements the level can be expressed not only in decibels but also in linear units. The vibration unit scale can be set in the **Display Scale** window (*path: Menu / Display / Display Scale / Scale*).

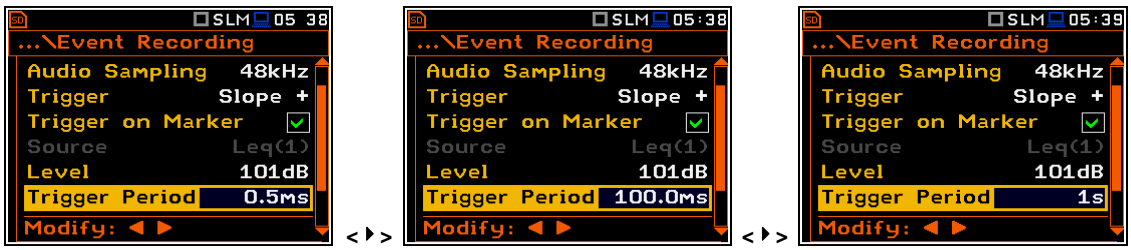


Level parameter selection (Sound modes)



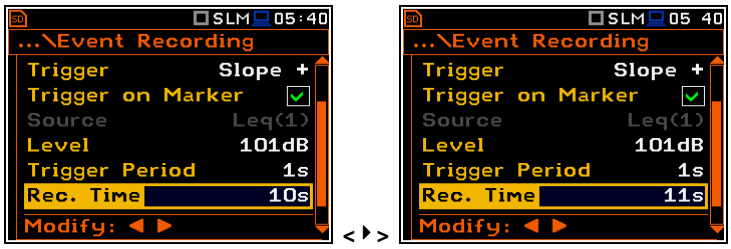
Level parameter selection (Vibration modes)

In the **Trigger Period** position it is possible to select the time interval when the triggering conditions are checked. This parameter can be set at **0.5ms**, **100.0ms** and **1s**.



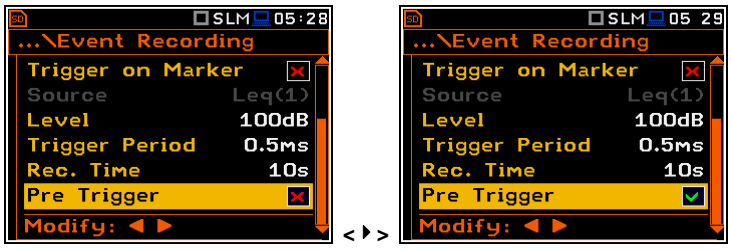
Trigger Period parameter selection

In the **Rec. Time** position it is possible to select the time of signal recording after triggering. If next triggering condition appears then the signal will be recording additional **Rec. Time**. The available values are from **1s** to **8h**.



Rec. Time parameter selection

When **Pre Trigger** position is switched on then the event signal is recorded before the triggering condition. The interval of such recording depends on the sample frequency. For 48kHz the time interval is 1s, for 24 kHz the time interval is 2 s, for 12 kHz the time interval is 4s.

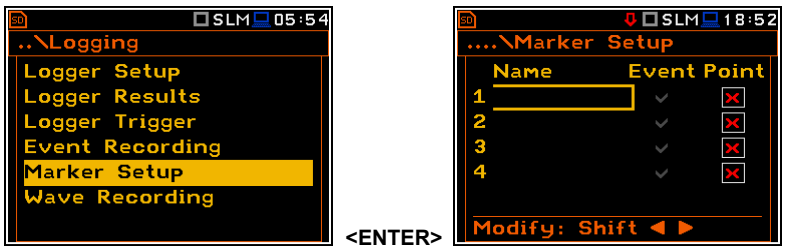


Pre Trigger parameter selection

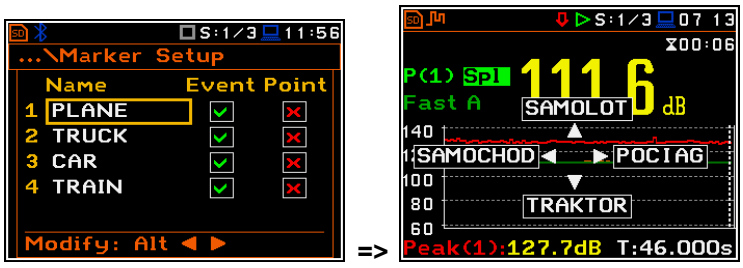
5.4.5 The marker setup – Marker Setup

Marker is used to mark special events during the measurement such as "airplane flight" and is nothing but an indication of the beginning and end of the block of logger results in which the event occurred. In case of point markers there is no start and end of marker, but only one record in the logger. Markers are activated in the result presentation window by pressing the arrow keys.

The **Marker Setup** enables the user to assign the name for the marker and define its type (normal or point).



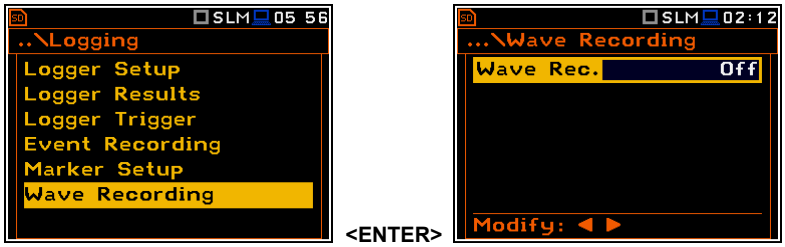
Marker Setup list opening



Marker Name setting

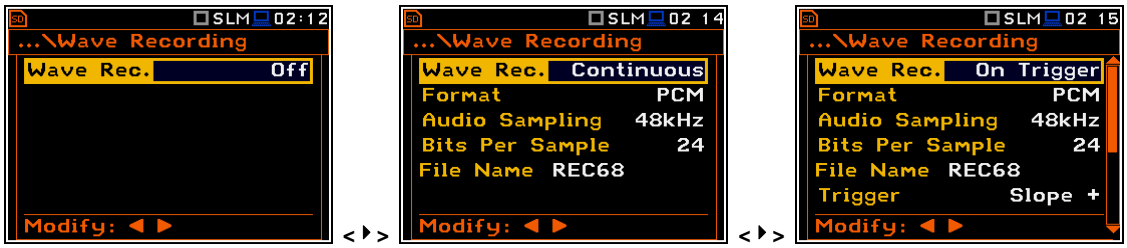
5.4.6 Wave recorder setup – Wave Recording

The **Wave Recording** enables the user to activate and to set the parameters of wave recording on the external memory (**SD Card** or **USB Disk**).



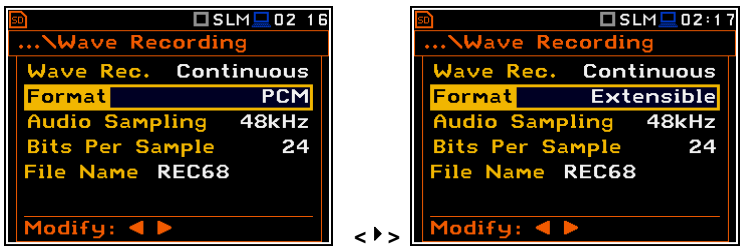
Wave Recording list opening

The **Wave Rec.** position, if it is not **Off**, defines the type of the wave recording: **Continuous** or **On Trigger**.



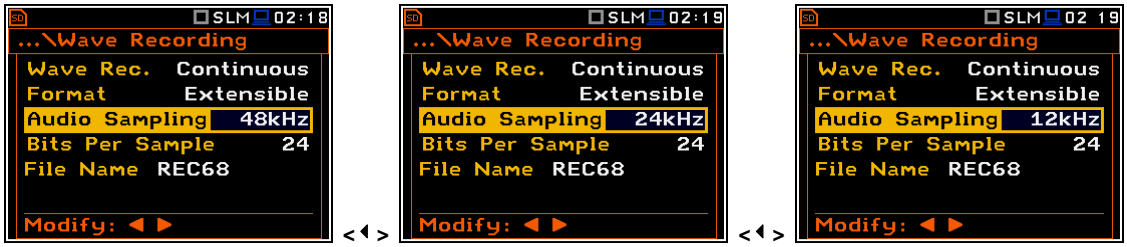
Wave Recording list; Wave Rec. parameter selection

The **Format** position enables the user to setup the format of the wave file header: **PCM** or **Extensible**.



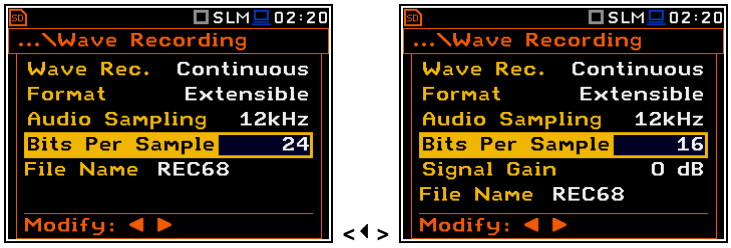
Wave Recording list; Format selection

The **Audio Sampling** position enables the user to setup the sampling rate: **12KHz**, **24kHz** and **48kHz**.



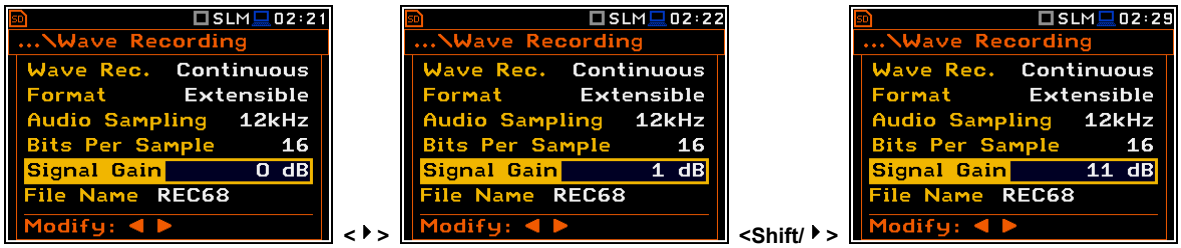
Wave Recording list; Audio Sampling selection

The **Bits Per Sample** position enables the user to setup the number of recorded bits per sample: **16** or **24**.



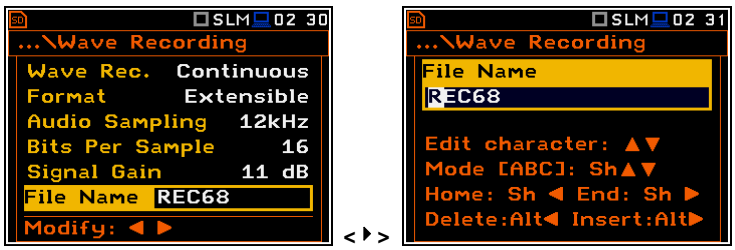
Wave Recording list; Bits Per Sample selection

The **Signal Gain** position enables the user to setup the gain of the recorded signal, when 16 bits per sample was selected: **0dB** … **40dB**.



Wave Recording list; Signal Gain selection

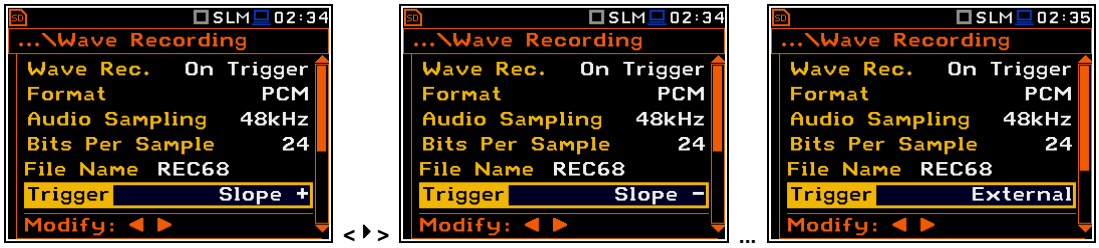
The **File Name** position enables the user to edit the name of the wave file.



Wave Recording list; File Name edition

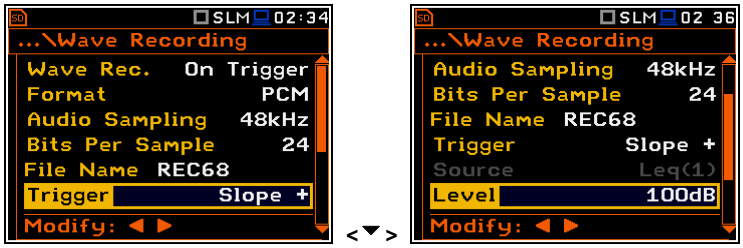
The **Wave Recording** enables the user to activate and programme the wave recorder trigger. This option became active only when the value of the parameter **Wave Rec.** was set as **On Trigger**.

In the **Trigger** position following options are available: **Slope +**, **Slope –**, **Level +**, **Level –** and **External**.



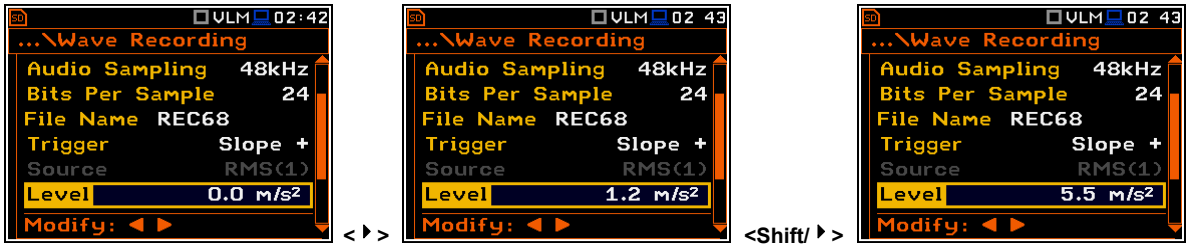
Wave Recording list; Trigger selection

The **Source** position only informs about the source signal. Only one measured result can be used as a source of the triggering signal in all modes, namely the output signal from the RMS detector coming from the first profile which is denoted here as **Leq(1)**. This position does not become active (it is not displayed inversely) and the text stated here remains unchanged. After pressing the **<▼>** push-button, the **Source** line is skipped.



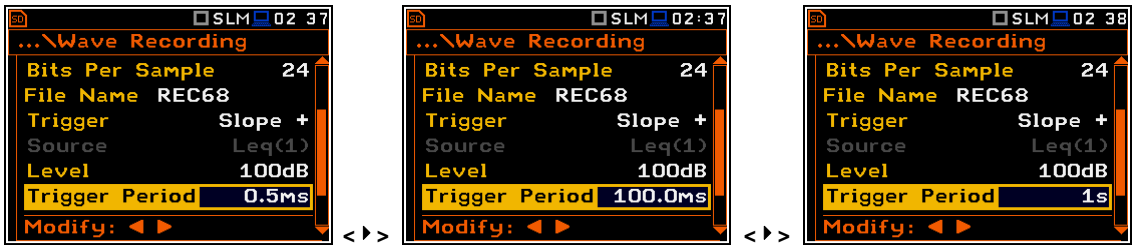
Wave Recording list; with the not active Source position

The level of the triggering signal for recording (**Level**) can be set from 24 dB to 136 dB range. In the case of Vibration measurements the level can be expressed not only in decibels but also in linear units. The vibration unit scale can be set in the **Display Scale** window (*path: <Menu> / Display / Display Scale / Scale*).



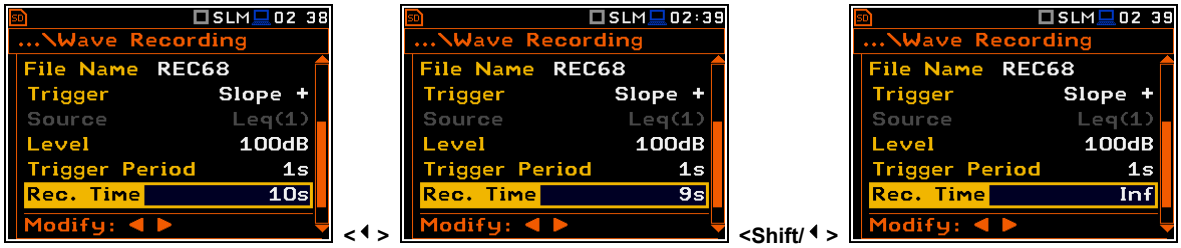
Wave Recording list; Level selection (Vibration modes)

In the **Trigger Period** position it is possible to select the time interval when the triggering conditions are checked. This parameter can be set at **0.5ms**, **100.0ms** and **1s**.



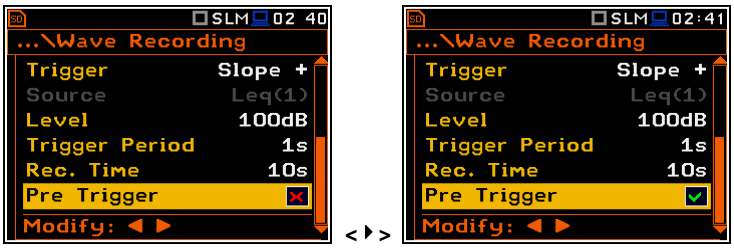
Wave Recording list; Trigger Period parameter selection

In the **Rec. Time** position it is possible to select the time of signal recording after triggering. If next triggering condition appears then the signal will be recording additional **Rec. Time**. The available values are from **1s** to **8h** or **Inf**.



Wave Recording list; Rec. Time selection (Sound modes)

When **Pre Trigger** position is switched on then the signal is recorded before the triggering condition. The interval of such recording depends on the sample frequency. For 48kHz the time interval is 1s, for 24 kHz the time interval is 2 s, for 12 kHz the time interval is 4s.

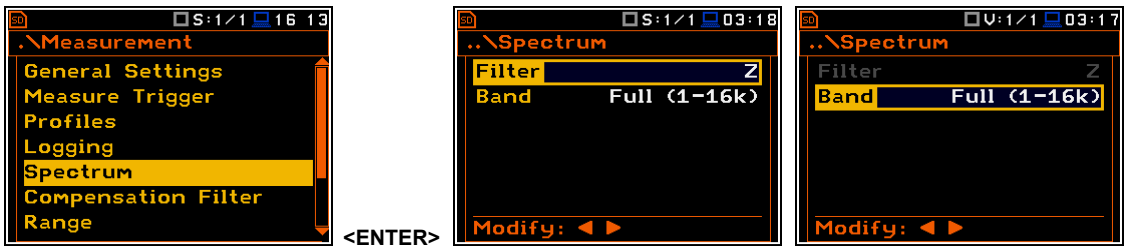


Wave Recording list; Pre Trigger switching on (Sound modes)

5.5 Selection of 1/1 Octave and 1/3 Octave spectrum parameters – Spectrum

The **Spectrum** appears in the **Measurement** list when the **1/1 Octave** or **1/3 Octave** function is selected in the **Measurement Function** (*path: <Menu> / Function / Measurement Function / 1/1 Octave or 1/3 Octave*). This sub-list is opened after the selection of the **Spectrum** text from the **Measurement** list by means of the **<▲>**, **<▼>** push-buttons and pressing **<ENTER>**.

The **Spectrum** consists of the parameters, which influence the calculation and logging the results of **1/1 Octave** or **1/3 Octave** analysis: **Filter** and **Band**. The **Spectrum** window is closed ignoring any changes made in there, after pressing any time the **<ESC>** push-button.



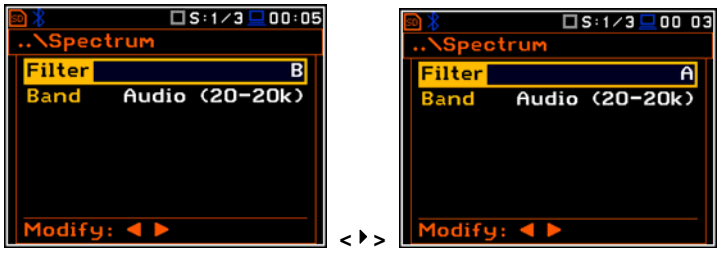
Spectrum selected in the Measurement list and the Spectrum window opened in the Sound and Vibration modes

Weighting filter selection in 1/1 Octave or 1/3 Octave analysis - **Filter**

The **Filter** influences the calculations of **1/1 Octave** or **1/3 Octave** analysis. In the case of sound measurements **HP**, **Z**, **A** and **C** filters are available. In the case of Vibration measurements only **Z** filter is available and the position is not accessible after entering the **Spectrum** window. The frequency characteristics of those filters are given in Appendix D.

The following weighting filters are available in the case of **1/1 Octave** or **1/3 Octave** analysis in sound modes:

- **HP** type 1 according to the IEC 61672-1 standard,
- **Z** type 1 according to the IEC 61672-1 standard,
- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards.

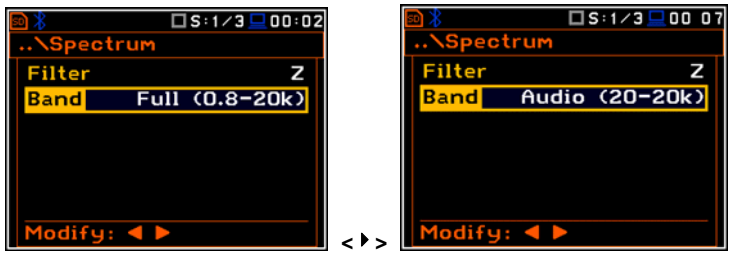


Spectrum window; the Filter selection in the Sound modes

In the case of Vibration modes, during **1/1 Octave** or **1/3 Octave** analysis the **HP** filter is available.

Selection the band during the 1/1 Octave or 1/3 Octave analysis - **Band**

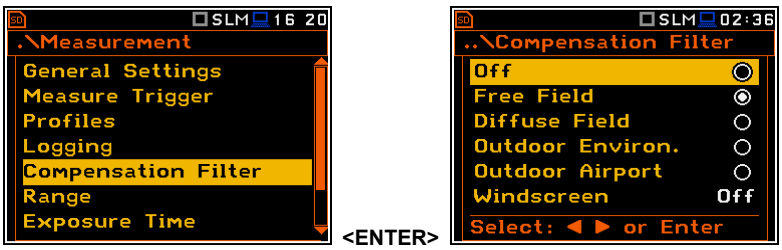
The **Band** position enables the user to select the band in which the **1/1 Octave** or **1/3 Octave** analysis of the signal has to be performed. Available values of the bands of the analysis are as follows: **Audio**, **Full**.



Spectrum window; the Band selection in the Sound modes

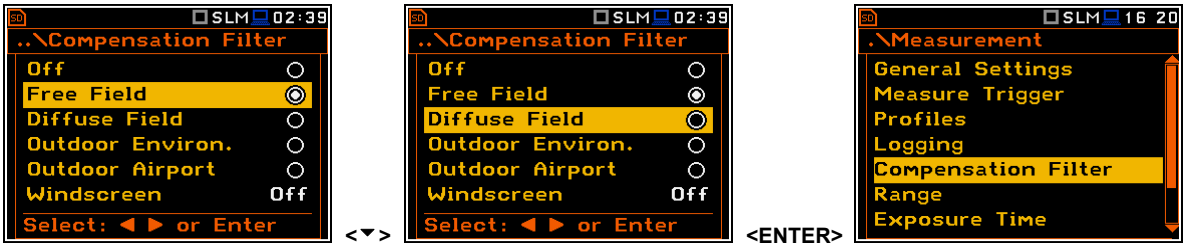
5.6 Selection of the microphone compensation filters – Compensation Filter

The **Compensation Filter** position is available only in the case of the **Sound Meter** or **Direct Sound** modes. It enables the user to set on or off the compensation filter and/or outdoor filter, select in the latter case its type and to set the proper conditions for making the measurements in the diffuse field.



Measurement list, the Compensation Filter selection

The **Compensation Filter** window consists of the list with 6 positions: **Off**, **Free Field**, **Diffuse Field**, **Outdoor Environ.**, **Outdoor Airport** and **Windscreen**. The position of the sub-list is changed after pressing the **<▲>**, **<▼>** push-buttons. In order to switch the filter on the user may mark it, by means of the **<◄>**, **<►>** push-buttons, and to confirm the selection with the **<ENTER>** push-button. The user can also press the **<ENTER>** push-button when the interesting position is selected without marking it by means of the **<◄>**, **<►>** push-buttons. Pressing **<ENTER>** push-button closes the sub-list. After pressing the **<ESC>** push-button the sub-list is also closed but all made changes will be ignored.

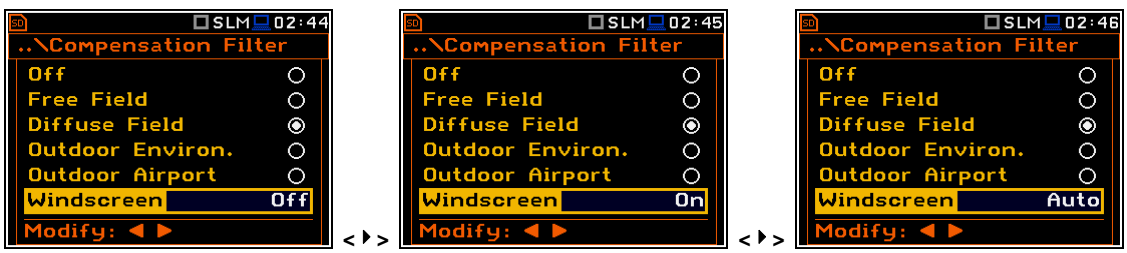


Compensation Filter window; selection of the Diffuse Field filter

The **Free Field** and **Diffuse Field** filters enables the user to set compensation for the measurements in the free field conditions or in the diffuse field conditions. The microphone supplied with the **SVAN 979** instrument (GRAS 40AE) is designed for the measurement performed in the free field conditions. The **Free Field** option means that the correcting filter for the diffuse field conditions is switched off. In the case of the measurements performed with the use of the microphones for the diffuse field conditions the option **Diffuse Field** should never be used.

Outdoor Environ. and **Outdoor Airport** filters are dedicated for the permanent outdoor monitoring application. The characteristics of the outdoor filters depend on the application: environmental (the acoustic signal is perpendicular to the microphone's grid) or airport (the acoustic signal is parallel to the microphone's grid). The frequency characteristic of the designed filters is given in App. D.

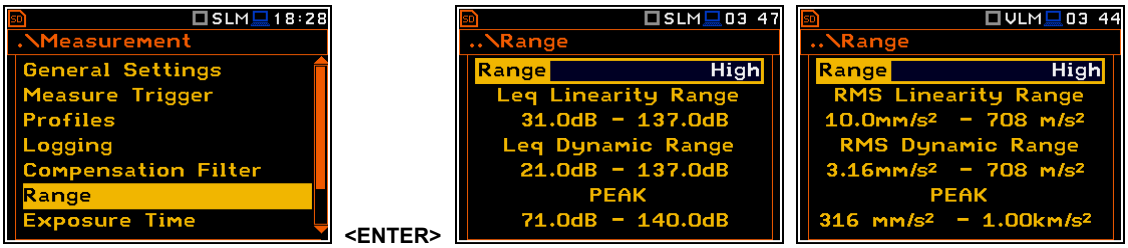
Windscreen filter can be switch **Off**, **On** or set to automatic detection – **Auto**.



Compensation Filter window; Windscreen parameter selection

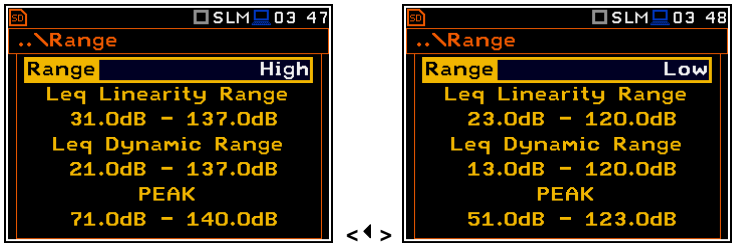
5.7 Measurement range setting – Range

The **Range** is used to set one of the available measurement ranges in the instrument.

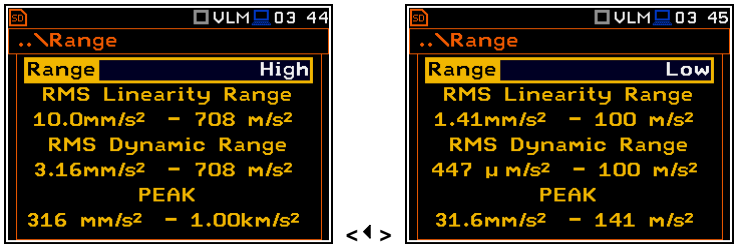


Measurement list with the Range selected in Sound Meter and Vibration Meter modes

There are two ranges available **High** and **Low**. The detailed description of the measurement ranges parameters is given in App. C. After pressing the **<ENTER>** push-button the change is confirmed and the window closes. The return to the **Measurement** list ignoring any changes made in the sub-list is made after pressing the **<ESC>** push-button.

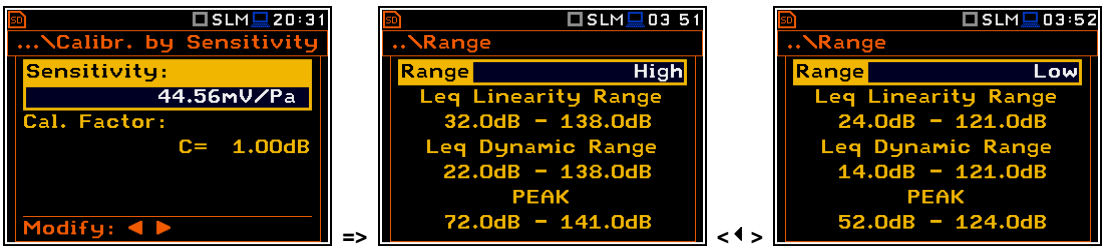


Range windows in Sound Meter mode; the Range selection



Range windows in Vibration Meter mode; the Range selection

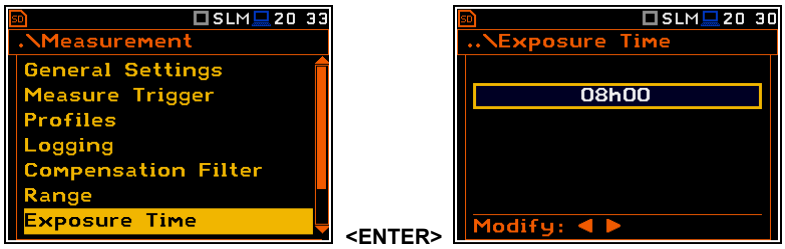
The range values changes due to the calibration factor.



Displays with change of the default range values in Sound Meter mode caused by the calibration factor

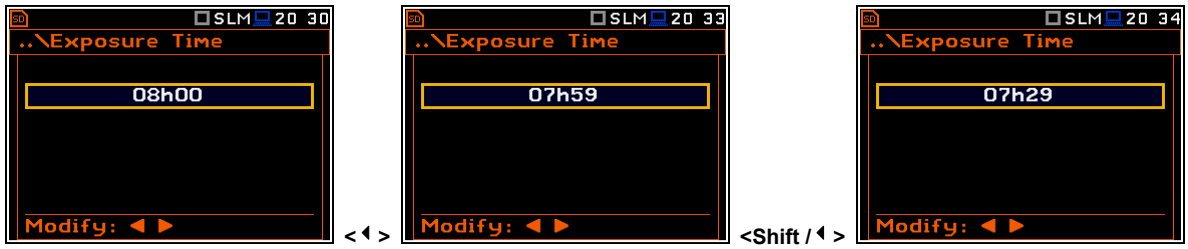
5.8 Exposure time setting - Exposure Time

The **Exposure Time** enables the user to set the desired value of the exposure time that is used for the calculation of **LEPd** (cf. App. D for the definitions of the functions). This sub-list is available only in the sound mode; in Vibration and voltage (Vibration) modes it is taken off from the **Measurement** list.



Measurement list with the Exposure Time text highlighted

The **Exposure Time** values are within the range [00h01, 08h00]. The required value can be set using the **<◄>** / **<►>** push-buttons – after each pressing the exposure time is decremented / incremented by one second. The step can be decremented / incremented up to 30 minutes after pressing the **<◄>** / **<►>** push-buttons together with the **<Shift>** one.



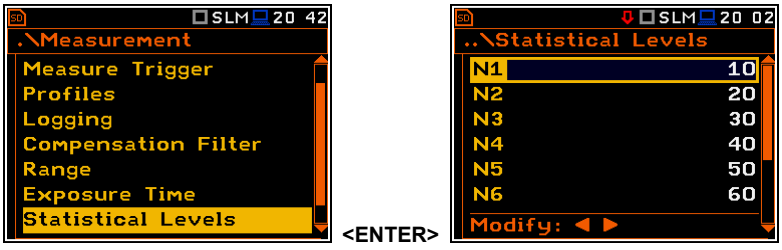
Exposure Time windows; setting the exposure time value

5.9 Setting ten statistical levels - Statistical Levels

The **Statistical Levels** position is available only in the case of the sound measurements (in the **Sound Meter** or **Voltage** (**Sound**) modes).

In the **Statistical Levels** it is possible to select which ten statistical levels, named from **N1** to **N10**, has to be calculated, displayed and saved in the files together with the main results.

In order to enter the sub-list the user has to select the **Statistical Levels** text in the **Measurement** list, using the **<▲>**, **<▼>** push-buttons and press the **<ENTER>** one.



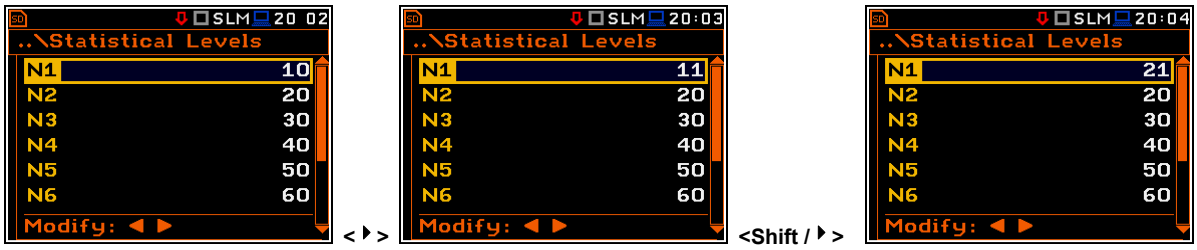
Measurement list, the Statistical Levels sub-list selected

The default statistic levels have the following settings: **10**, **20**, **30**, **40**, **50**, **60**, **70**, **80**, **90** and **95**. All values have to be within the range [1, 99]. Each one value can be set independently from the others. The selection of the **Nx** is made using the **<▲>**, **<▼>** push-buttons.

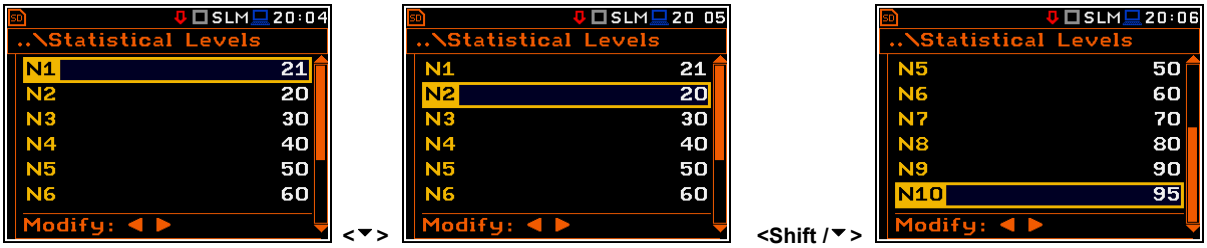
The upper **Nx** visible on the display is active after pressing the **<▲>** together with the **<Shift>** push-button. The lower **Nx** visible on the display is active after pressing the **<▼>** together with the **<Shift>** push-button.

The **Nx** current value decreasing / increasing by one is possible by means of the **<◀>** / **<▶>** push-buttons. The step can be decreased / increased up to ten after pressing simultaneously the **<◀>** / **<▶>** push-buttons with the **<Shift>** one.

The sub-list is closed and the instrument returns to the **Measurement** list after pressing the **<ENTER>** (with the confirmation of all changes made in this list) or **<ESC>** push-buttons (ignoring all changes).



Displays in the Statistical Levels set-up

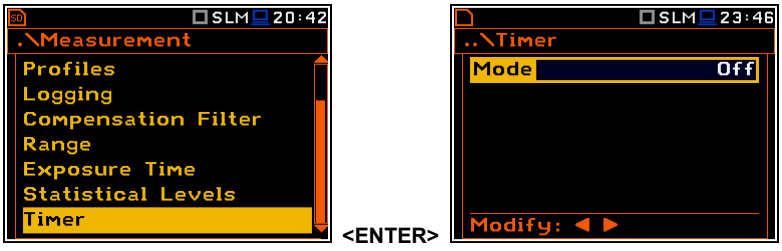


Displays in the Statistical Levels selection

5.10 Programming the instrument's internal timer – Timer

The **Timer** enables one to programme the internal timer. The instrument can be switched on by itself in the programmed time and it can perform the measurement, which was used before its switching off.

In order to enter the position the user has to select the **Timer** text in the **Measurement** list and press the **<ENTER>** one.



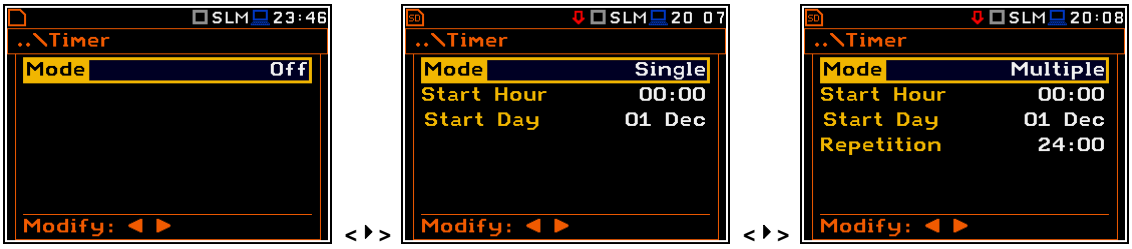
Measurement list, the Timer window opening

Selecting the mode of the timer function – **Mode**

The timer can be switched off – **Off**, switched on only once – **Single**, or switched on many times regularly – **Multiple** with the period between two consecutive measurements set in the **Repetition** line.

The selected value has to be confirmed by pressing the **<ENTER>** push-button, which causes the simultaneous return to the **Measurement** list. All settings are ignored after the return to the **Measurement** list by pressing the **<ESC>** push-button.

In the case the timer function is active (**Single** or **Multiple**) and the instrument is switched on the "**clock**" icon appears until finishing the programmed measurements.



Timer windows; the mode selection

Setting hour of the instrument's switch on – **Start Hour**

The **Start Hour** determines hour of the measurement start. The required hour and minute can be selected in a special window, which is opening by means of **<◄>**, **<►>** push-buttons.

In order to set hours or minutes one has to enter its position pressing the **<◄>**, **<►>** push button and then select the proper value by means of the **<▲>, <▼>** push-buttons and then to press the **<ENTER>** push-button.

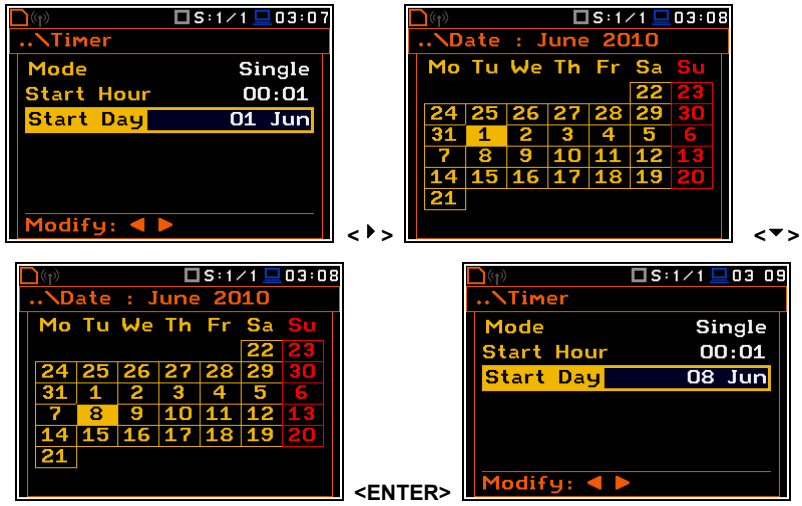
Timer windows; setting hour and minute for the instrument's switching on

The selected value in the **Timer** list has to be confirmed by pressing the **<ENTER>** push-button, which causes the simultaneous return to the **Measurement** list. All settings are ignored after the return to the **Measurement** list by pressing the **<ESC>** push-button.

Setting day of the instrument's switch on - **Start Day**

The **Start Day** determines the date of the measurement start. The timer can be programmed up to one month ahead and during the date setting the current state of the **R**eal **C**lock is taken into account. The required date can be selected in a special window, which is opening after pressing the **<◄>**, **<►>** push-buttons when the **Start Day** text is displayed inversely in the **Timer** sub-list.

In order to set data one has to select its position by means of the **<◄>** , **<►>** and **<▲>, <▼>** push button and then press the **<ENTER>** push-button.



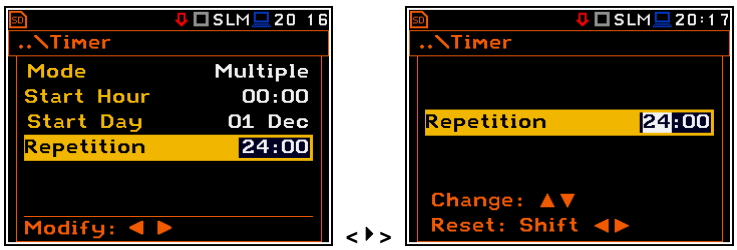
Timer windows; setting day of the instrument's switch on

The selected value in the **Timer** list has to be confirmed by pressing the **<ENTER>** push-button, which causes the simultaneous return to the **Measurement** list. All settings are ignored after the return to the **Measurement** list by pressing the **<ESC>** push-button.

Selecting the period between two consecutive measurements – **Repetition**

The **Repetition** of the timer function is selected pressing the **<▲>, <▼>** push-buttons together with the **<Alt>** one when the **Repetition** text is displayed inversely in the **Timer** sub-list (mode **Multiple)**. This parameter can be programmed from **00:00** up to **99:59**.

In order to set the proper value one has to select hours or minutes pressing the **<◄>, <►>** push-buttons and then, pressing the **<▲>, <▼>** push-buttons together with the **<Alt>** one to select the proper value. The selected value has to be confirmed by pressing the **<ENTER>** push-button, which causes the simultaneous return to the **Measurement** list. All settings are ignored after the return to the **Measurement** list by pressing the **<ESC>** push-button.



Timer windows; setting Repetition parameter

The selected value in the **Timer** list has to be confirmed by pressing the **<ENTER>** push-button, which causes the simultaneous return to the **Measurement** list. All settings are ignored after the return to the **Measurement** list by pressing the **<ESC>** push-button.

5.10.1 Description of the exemplary timer function execution

The **Timer** function is used to programme the instrument's switch on at the given time and perform the measurements with the parameters set in the **Measurement** sub-list.

Let us assume that the user wants to switch on the instrument the 1st of April, at 20:35, measure sound during 10 seconds without using logger and save the results in a file R1.

In order to do this the user has to set the parameters of the **Timer** function, the measurement parameters (*path: <Menu> / Measurement / General Settings*), activate the **Auto Save** function (*path: Menu / File / Save Options*), named the file (the **File Name** window is opened after switching on the **Auto Save** function) and finally – switched off the instrument.

Exemplary settings made for the desired execution of the Timer function

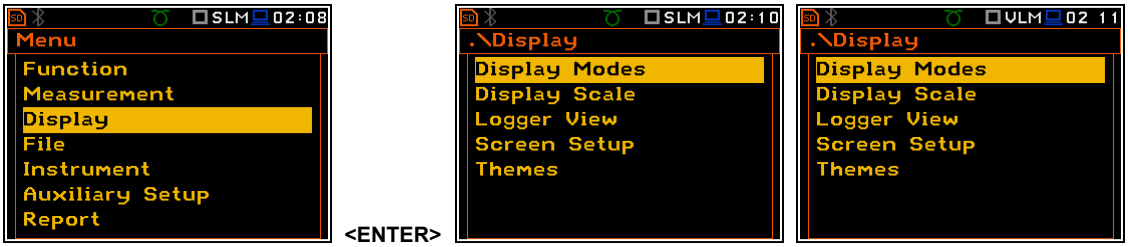
The instrument will be switched on the 1st of April at 20:35 and will be warmed up for the period of 60 seconds decrementing by one after each second the counter visible on the display.

After warming up the instrument and the preset **Start Dalay** time, the measurements are performed for a period of ten seconds. Then, the results are saved in the file which name was given or accepted (the proper information is displayed) and finely – the instrument is switched off.

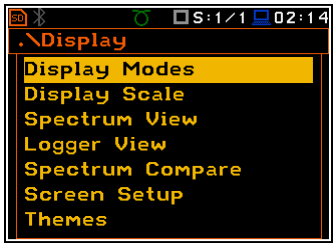
Notice: *The instrument's Timer function can be used for multiply measurements (at the programmed day and time with the selected repetition). The first switch on of the instrument must be within one month ahead.*

6. DATA AVAILABLE ON THE DISPLAY – Display

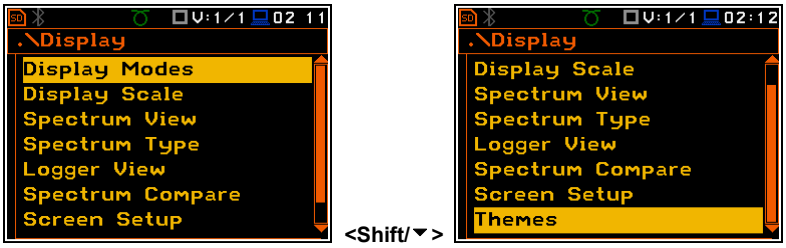
The **Display** list contains the elements that enable one the independent programming of the display parameters. In order to open the **Display** list the user has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**.



Display window; for Sound Level Meter and Vibration Level Meter modes



Display list; for 1/1 Octave and Sound modes



Display list; for 1/1 Octave and Vibration modes

The **Display** list is used for setting the various parameters, which are mainly dedicated for the control of the display. The following items are present on this list:

Display Modes enables one to select the mode of the measurement results presentation;

Display Scale enables one to change the scale in the graphical modes of result's presentation;

Spectrum View enables one to change the type of the spectrum and to activate the **Max** and **Min** spectrum;

Spectrum Type enables one to change the spectrum type: **Acceleration**, **Velocity** and **Displacement**;

Logger View enables one to select and present the results stored in the logger's files;

Spectrum Compare enables one to compare spectrum with the reference one;

Screen Setup enables one to set the brightness and the switch on/off the screen saver of the instrument's display;

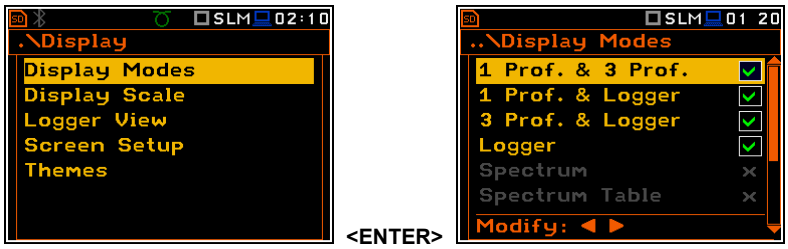
Themes enables one to set the colour theme of the display;

6.1 Selection of the modes of measurement results presentation - Display Modes

The One Profile mode is always available in all measurement modes. Other presentation modes can be switched on or off in the **Display Modes** sub-list. The selection is made by marking the inversely displayed position of the **Display Modes** sub-list by means of the **<◄>**, **<►>** push-buttons. In order to confirm the selection the user has to press the **<ENTER>** push-button.

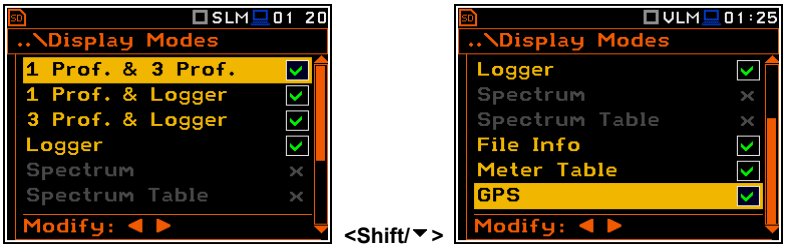
The mode of the results presentation is related with the selection of the instrument's function (**SLM** or **VLM**, **1/1 Octave**, **1/3 Octave**, etc.).

Notice: *In all modes and measurement functions One Profile mode is always active and can not be switched off.*



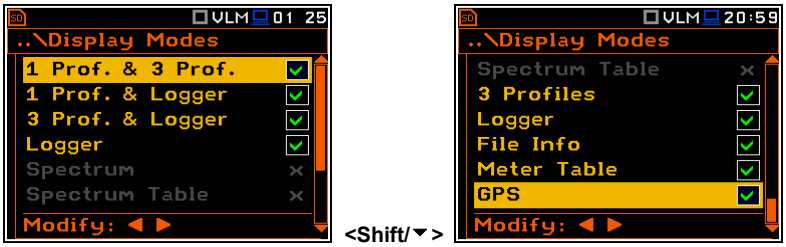
Display Modes windows in the Sound Level Meter mode

For the **Sound Level Meter** the following possibilities of the measurement results presentation are available: **1 Prof. & 3 Prof.**, **1 Prof. & Logger**, **3 Prof. & Logger**, **Statistics**, **File Info**, **Meter Table**, **GPS**.



Display Modes window in the Sound Level Meter mode

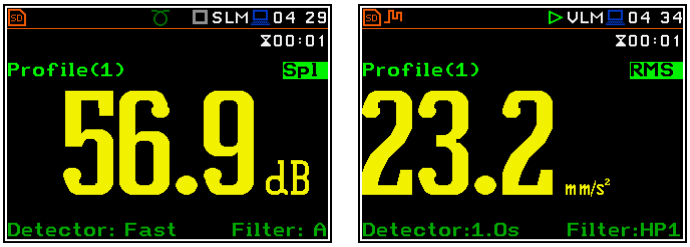
For the **Vibration Level Meter** the following possibilities of the measurement results presentation are available: **1 Prof. & 3 Prof.**, **1 Prof. & Logger**, **3 Prof. & Logger**, **File Info**, **Meter Table**, **GPS**.



Display Modes window in the Vibration Level Meter mode

6.1.1 One profile presentation mode

The One Profile mode is always available in all measurement modes. The display with the measurement result in one profile mode is presented below.

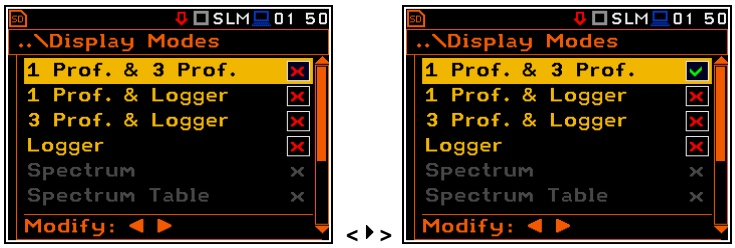


Displays in one profile for Sound and Vibration modes

6.1.2 Combined presentation modes

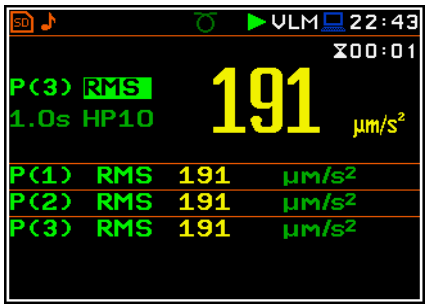
There are three presentation modes, which combine two views and can be active or not: **1 Prof. & 3 Prof.**, **1 Prof. & Logger**, **3 Prof. & Logger**. These combined views allow the user to compare results for profiles and to follow the history of measured results, saved in the logger file.

Switching on the view for one and three profiles - **1 Prof. & 3 Prof.**



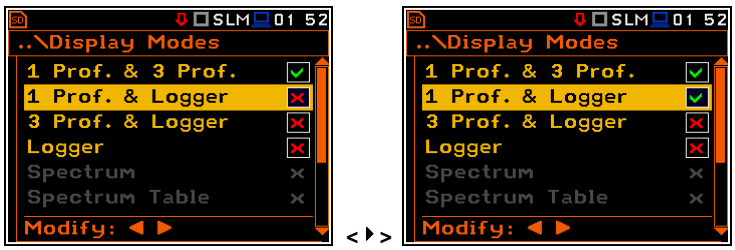
Switching on the view for one and three profiles

Below is the view of the screen when combined presentation mode of **1 Profile** and **3 Profiles** results is switched on.



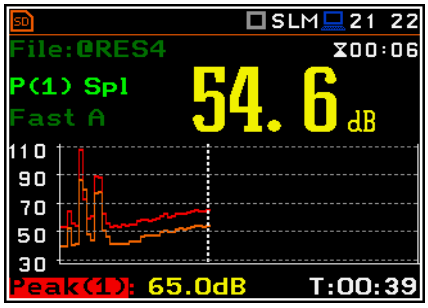
Display in the 1 Prof. & 3 Prof. view

Switching on the view for one profile and logger - **1 Prof. & Logger**



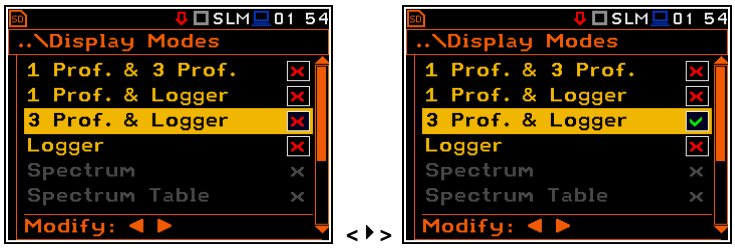
Switching on the view for one profile and logger

Below is the view of the screen when combined presentation mode of **1 Profile** and **Logger** results is switched on.



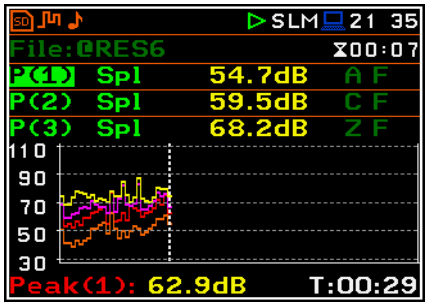
Display in the 1 Prof. & Logger view

Switching on the view for three profiles and logger - **3 Prof. & Logger**



Switching on the view for three profiles and logger

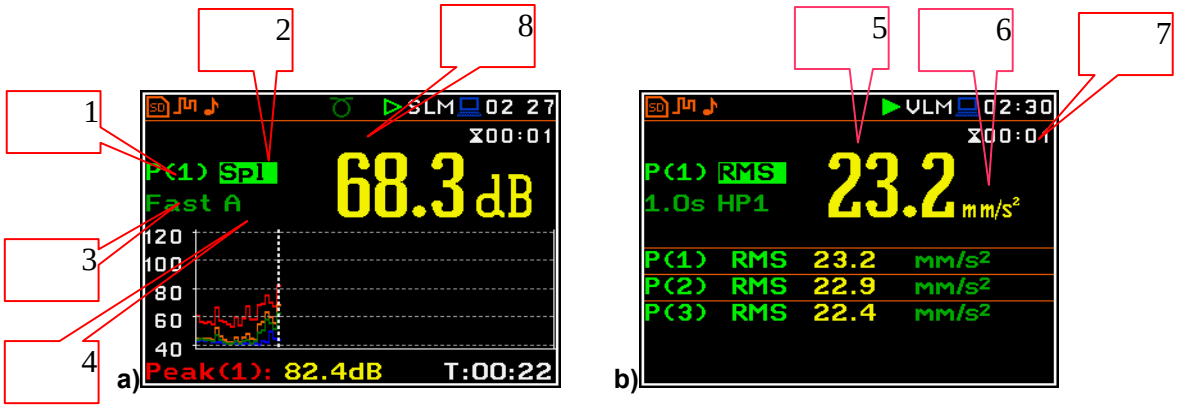
Below is the view of the screen when combined presentation mode of **1 Profile** and **Logger** results is switched on.



Display in the 3 Prof. & Logger view

When the selected results from the profiles (*path: <Menu> / Measurement / Logging / Logger Results*) are logged the **"curve"** icon became visible and the logger plot arrears on the screen.

Fields description of the **1 Profile** view



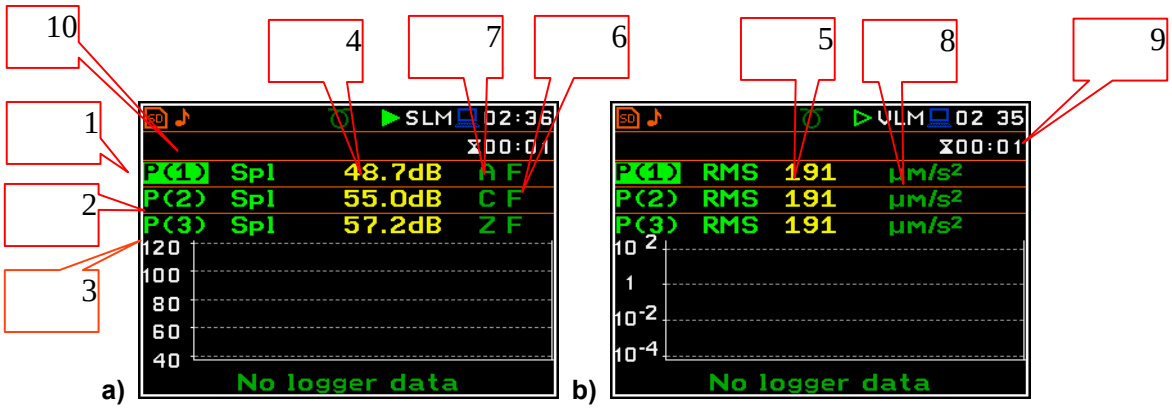
Fields description of the 1 Profile view

1. Profile number.
2. Function name: **Spl**, **Leq**, **Sel**, **Le**, **LEPd**, **Ltm3**, **Ltm5**, **Lxx**, **Ovl**, **Peak**, **Max**, **Min** in the case of Sound measurements or **RMS**, **Ovl**, **Peak**, **P–P**, **MTVV** in the case of Vibration measurements.
3. Detector time constant: in the case of Sound measurements when the detector is exponential: **IMP.**, **FAST**, **SLOW** or **Lin** when the detector is linear and in the case of Vibration measurements: **100 ms**, **125 ms**, **.. 10.0 s**, **…**
4. The name of the implemented filter: **Z**, **A**, **C**, **B**, **G** in the case of Sound measurements or **Z**, **HP1**, **HP3**, **HP10**, **Vel1**, **Vel3**, **Vel10**, **VelMF**, **Dil1**, **Dil3**, **Dil10**, **Wh** in the case of Vibration measurements.
5. The value of measured function.
6. Units of measured value.
7. Elapsed time shows the current second of the measurement. The value presented there belongs to the range [**1**, **Integration Period**].
8. File name when Auto Save Function is activated (*path: <Menu> / File / Save Options / Auto Save:*☑)

***Notice**: In the case of **RMS Integration** is linear (path: <Menu> / Measurement / General Settings / RMS Integration: Lin) for **Leq**, **Sel**, **Le**, **LEPd** and **Lxx** results on the display appears **Lin.** instead of **Imp.**, **Fast** or **Slow** detector time constant.*

***Notice**: There is not any indication of the detector in the case of **Peak** and **Ovl** results.*

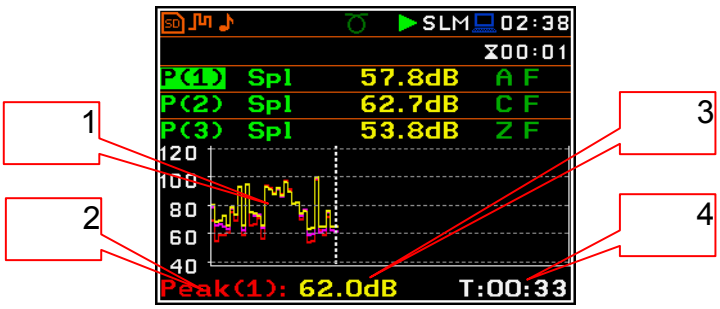
Fields description of the **3 Profile** view



Fields description of the 3 Profiles view

1. Result line for Profile 1.
2. Result line for Profile 2.
3. Result line for Profile 3.
4. Function name: **Spl**, **Leq**, **Sel**, **Le**, **LEPd**, **Ltm3**, **Ltm5**, **Lxx**, **Ovl**, **Peak**, **Max**, **Min** in the case of Sound measurements or **RMS**, **Ovl**, **Peak**, **P–P**, **MTVV** in the case of Vibration measurements.
5. The value of measured function.
6. Detector time constant: in the case of Sound measurements when the detector is exponential: **IMP. (I)**, **FAST (F)**, **SLOW (S)** or **Lin (L)** when the detector is linear. In the case of Vibration measurements this field is skipped.
7. The name of the implemented filter: **A**, **C**, **Z** in the case of Sound measurements. In the case of Vibration measurements this field is skipped.
8. Units of measured value.
9. Elapsed time shows the current second of the measurement. The value presented there belongs to the range [**1**, **Integration Period**].
10. File name when **Auto Save** function is activated (*path: <Menu> / File / Save Options / Auto Save:*☑)

Fields description of the **Logger** view

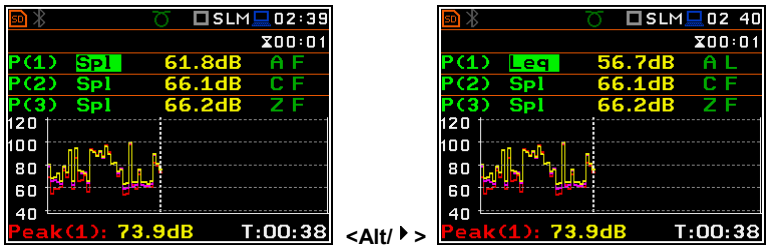


Display with the active Logger (with "curve" icon)

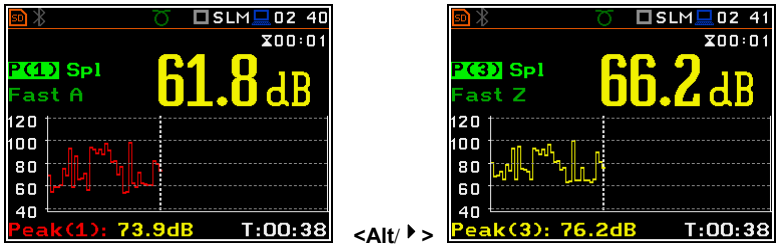
1. Logger Plot
2. Function name (Profile number)
3. Function value for cursor position
4. Cursor time position

Changing the field content

The content of some fields can be changed after pressing the **<◄>** and **<►>** push-buttons pressed together with the **<Alt>** one.



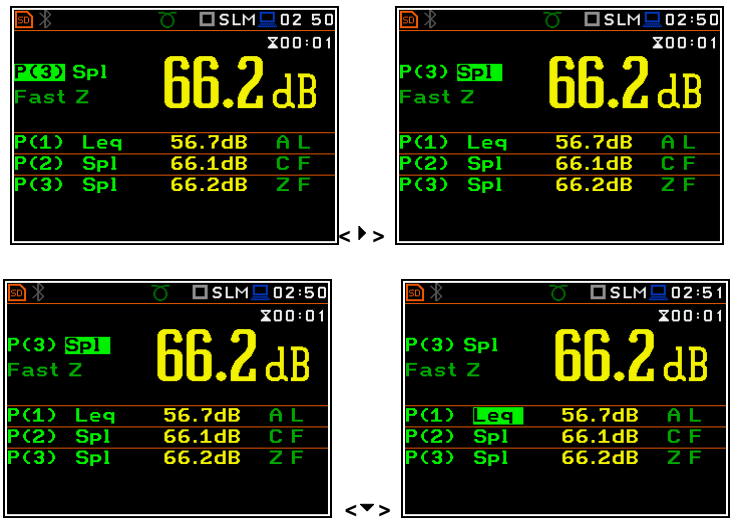
Function name changing



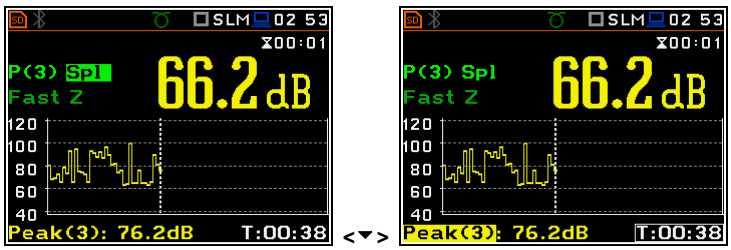
Changing of profiles

Changing the active fields

The change fields is made by pressing the **<▲>** / **<▼>** (vertically) or **<◄>** / **<►>** (horizontally) push-buttons.



Changing positions



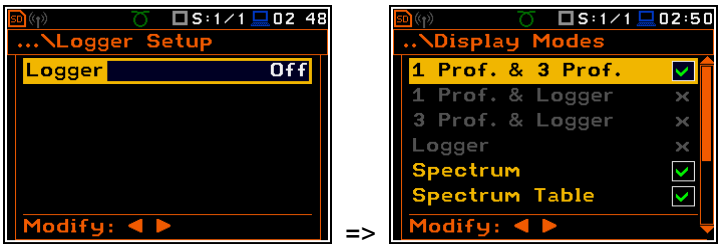
Changing positions

Changing the presentation mode

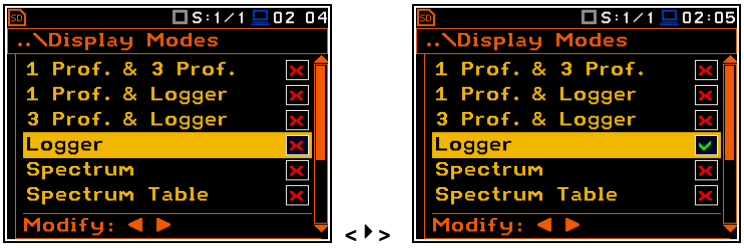
The presentation mode is changed after pressing the **<▲>** or **<▼>** push-buttons pressed together with the **<Alt>** one.

6.1.3 Setting on/off logger view – Logger

The presentation mode **Logger** depends on the settings made in the **Logging** list (*path: <Menu> / Measurement / Logging). If* ***Logger*** (*path: <Menu> / Measurement / Logging / Logger Setup)* is switched off the **Logger** presentation mode is **not** active!

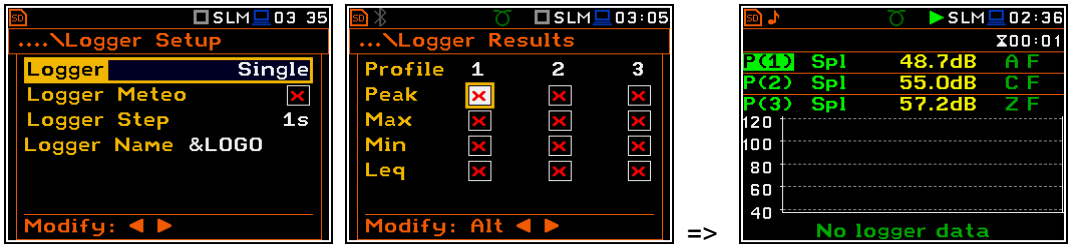


So, to have this presentation mode active, the user has to switch the **Logger** on!



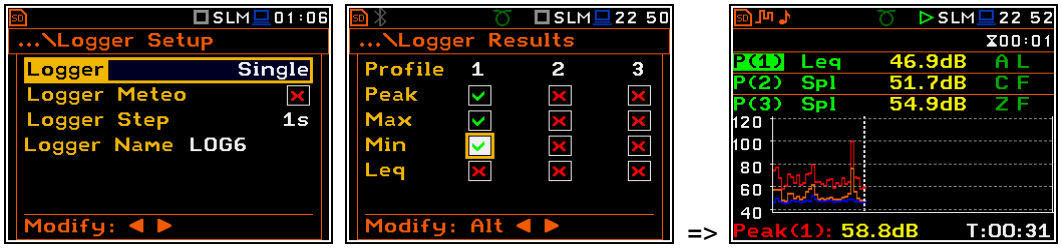
Activation of Logger presentation mode

When **Logger** is switched on and there is no results selected for logging the screen in one profile visualisation mode is like below.



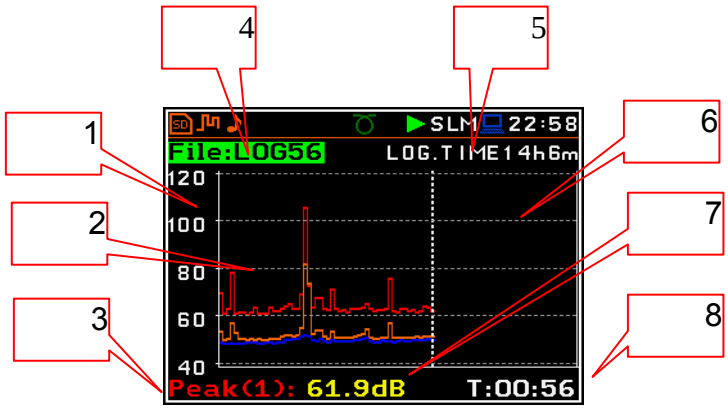
1 Prof. & Logger screen when Logger is active, but without selected results

When **Logger** is switched on and there are results selected for logging the screen in one profile visualisation mode is like below.



1 Prof. & Logger screen when Logger is active and results are selected

The display with the logger results is presented below.

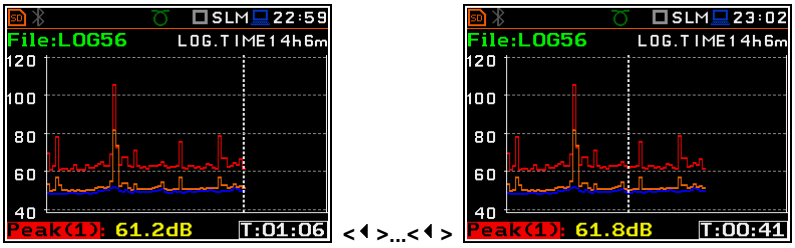


Display in the Logger view

Fields description:

1. Y-scale
2. Logger plot
3. Name of the logged result and profile number
4. Name of the logger file
5. Log. Time displays the time available for recording the logging results (limited by available memory space)
6. Cursor position
7. Result value for the cursor position
8. Elapsed time

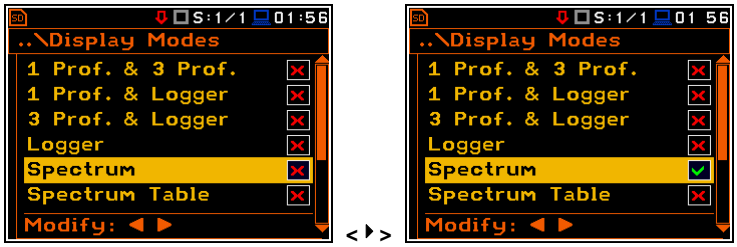
The user may change the cursor position by means of the **< ◀ >**, **< ▶ >** push-buttons.



Change the cursor position for the logger plot

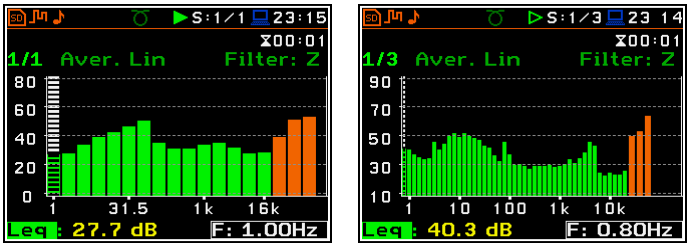
6.1.4 Switching on/off spectrum view – Spectrum

The **Spectrum** position is accessible only for **1/1 Octave**, **1/3 Octave** and **FFT** functions (*path: <Menu> / Function / Measurement Function*).

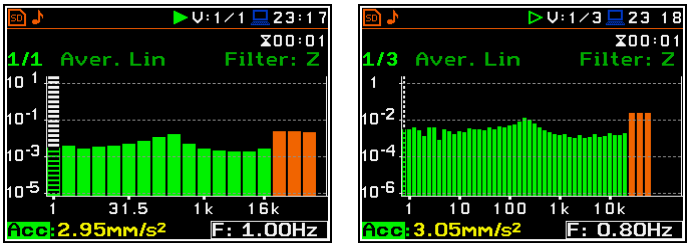


Switching on the view for Spectrum

When **Spectrum** mode is switched on the measurement screen in Spectrum visualisation mode is like below.

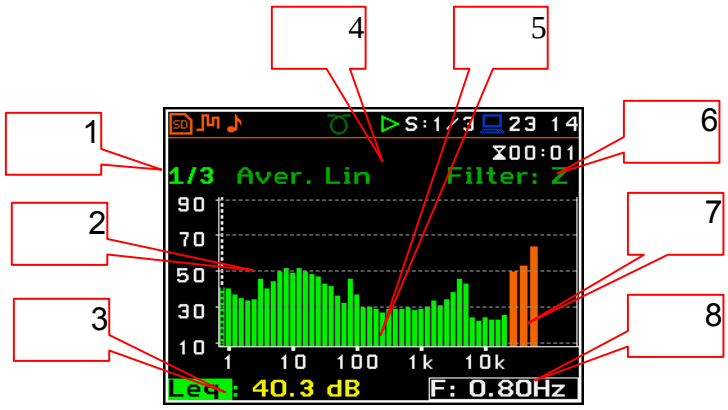


Displays in Spectrum view for 1/1 Octave and 1/3 Octave function (Sound modes)



Displays in Spectrum view for 1/1 Octave and 1/3 Octave function (Vibration modes)

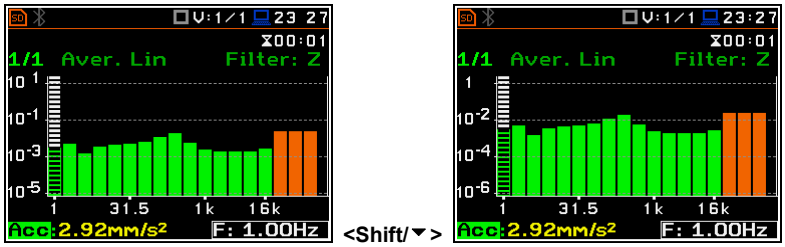
Fields description of the **Spectrum** view



Display in Spectrum mode for 1/3 Octave measurement

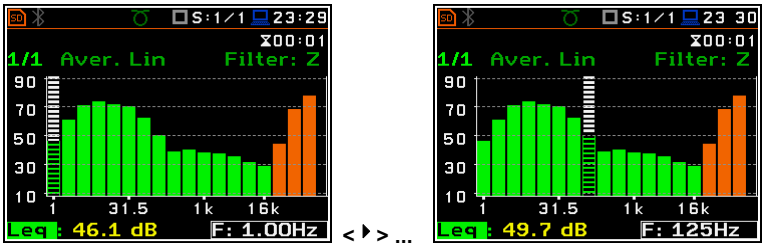
1. Averaging type
2. Cursor position
3. Value for the cursor position
4. Used weighting filter
5. Spectrum plot
6. Function type
7. Total values
8. Central frequency for the cursor position

The user may shift the Y-axis during the spectrum presentation after pressing the **<Shift>** and **<▲>** (or the **<Shift>** and **<▼>**) push-buttons.



Change the Y-axis scale for the 1/3 Octave results

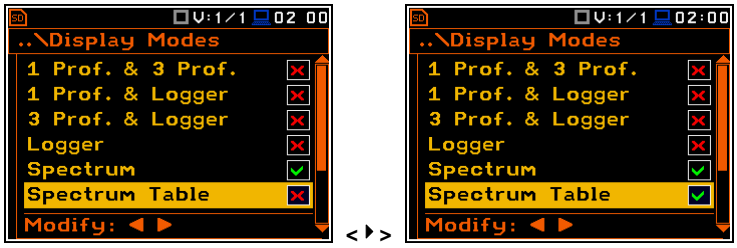
The user may change the cursor position by means of the **<◀>**, **<▶>** push-buttons. The frequency and appropriate value are presented in the line below the plot.



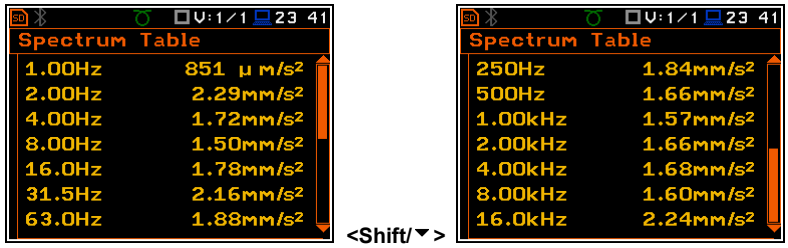
Change the cursor position for the 1/1 Octave spectrum

6.1.5 Switching on/off spectrum table view – Spectrum Table

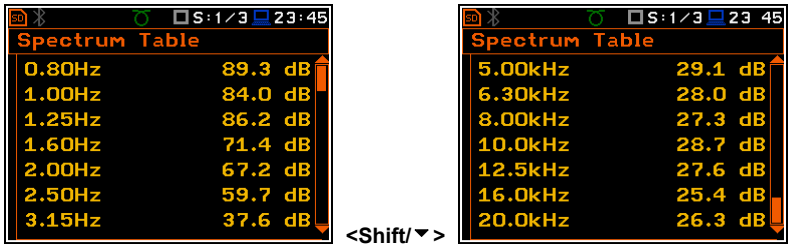
The **Spectrum Table** position is accessible in **1/1 Octave** and **1/3 Octave** function (*path: <Menu> / Function / Measurement Function*).



Switching on the view for Spectrum Table



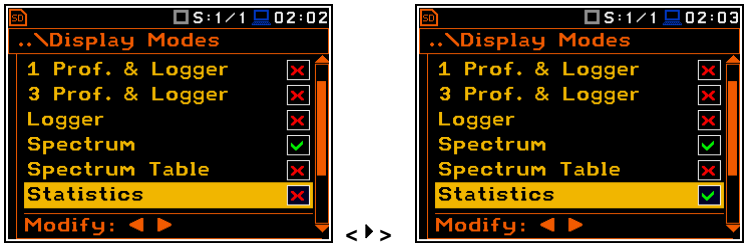
Displays in Spectrum Table view for 1/1 Octave function (Vibration modes)



Displays in Spectrum Table view for 1/3 Octave function (Sound modes)

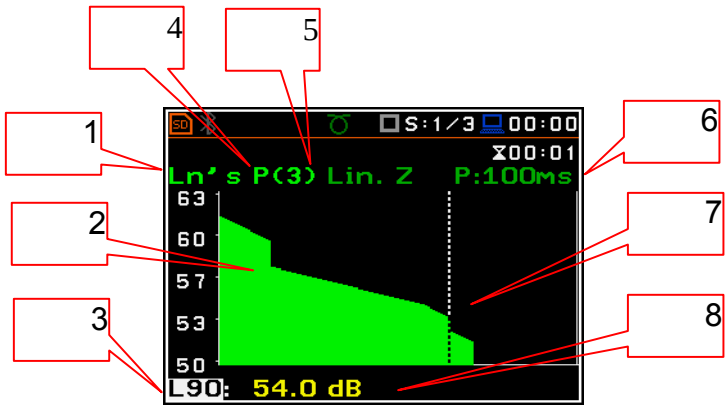
6.1.6 Setting on/off statistics view in Sound modes – Statistics

The **Statistics** position is accessible only for **Sound** measurements.



Setting on and off the accessibility of statistics presentation mode

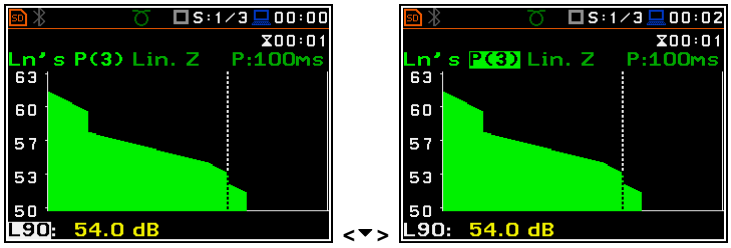
Fields description of the **Statistics** view



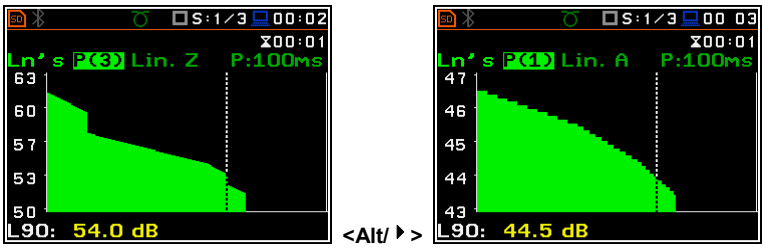
Display in Statistic view mode

1. Active profile
2. Statistics plot
3. Statistical level for the active cursor position
4. RMS detector (**Lin.**, or **Exp.**: **Fast**, **Slow** or **Imp**.)
5. Used averaging filter name (**A**, **C** or **Z**)
6. Function name
7. Cursor position
8. Value of the selected statistical level **Lxx** and units (dB)

The change between positions is made by pressing the **<▲>** or **<▼>** push-buttons. When position is chosen, then its value is changed after pressing the **<◄>** and **<►>** push-buttons pressed together with the **<Alt>** one.

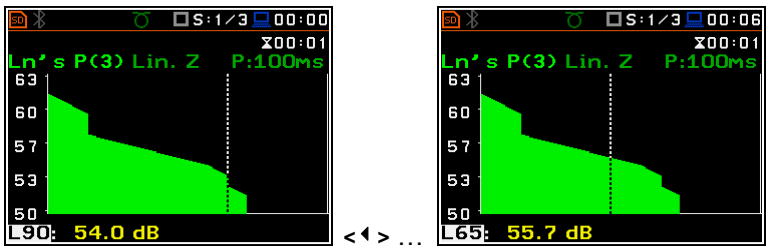


Change the position from L90 to P(1)



Changing the number of profile displayed

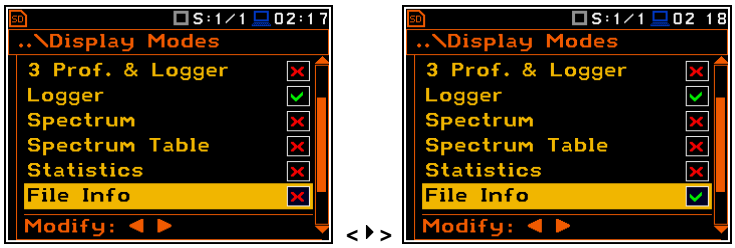
When the **Lxx** field is active the user may change the cursor position by means of the **<◄>**, **<►>** push-buttons. The statistical level and appropriate value are presented in the line below the plot.



Changing the cursor position

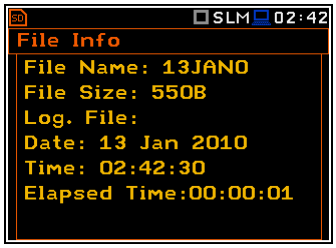
6.1.7 Setting on/off the view of the file description - File Info

The **File Info** position switches on or off the additional file description during the measurement.



Activation of the file description presentation mode

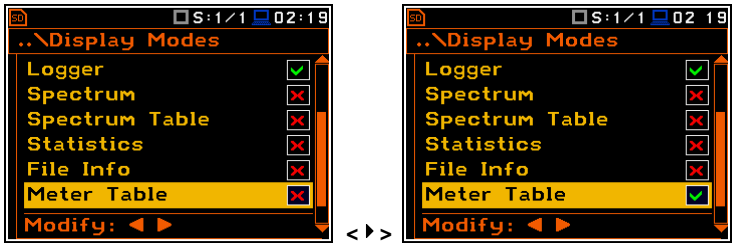
The **File Info** window indicates the file name, its size, date and time of the registration of the main results (cf. App. B) and time (**Elapsed Time**) during which the main results saved in the logger were measured. The value presented there belongs to the range [**1**, **Integration Period**] and depends on the moment and the way the measurements were stopped.



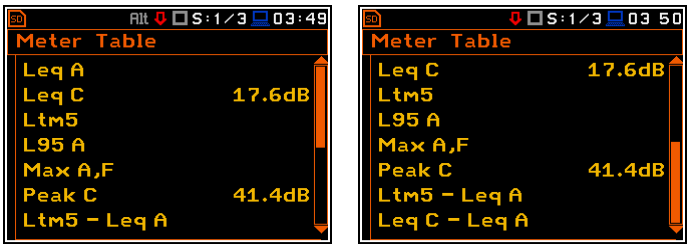
Exemplary contents of the File Info window

6.1.8 Setting on/off the view of the measurement results – Meter Table

The measured results may be also displayed as a list of all measured functions in profiles with assigned filters and time constants. In case the same functions are set up in two profiles the results for the first profiles will be displayed.



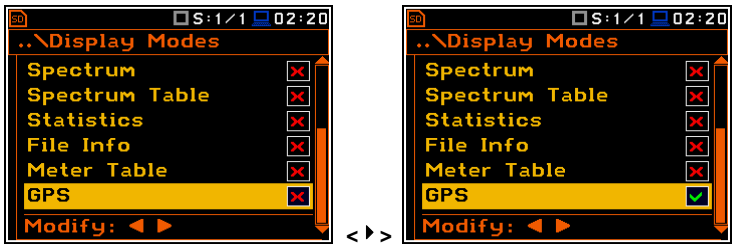
Activation of the Meter Table presentation mode



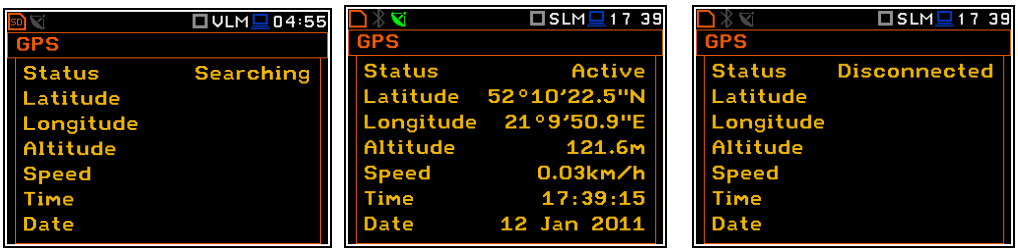
Exemplary contents of the Meter Table window

6.1.9 Setting on/off the view of the GPS information – GPS

The **GPS** view enables one to display the information from GPS-device connected to the USB port of the instrument. The **GPS** view can be active only if options **GPS Host Port** or **GPS Device Port** are active (*path: <Menu> / Instrument / Communication Ports*).



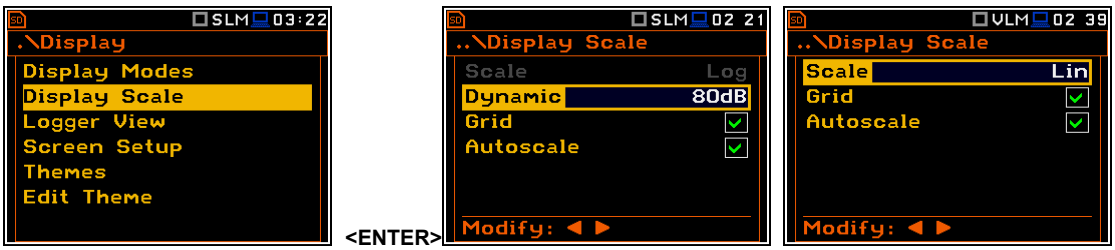
Activation of the GPS presentation mode



Exemplary contents of the GPS window

6.2 Setting the scale of the presentation and the display's grid - Display Scale

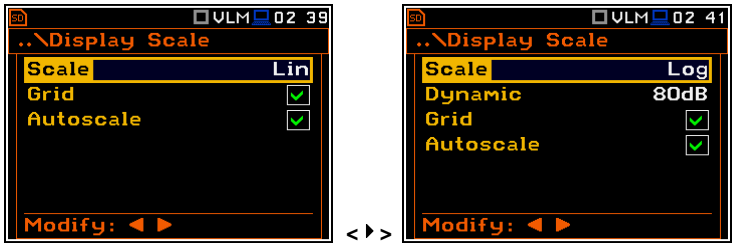
The **Display Scale** sub-list enables the user to change the scale in the available modes of graphical presentation of the measurement results and switch on/off the grid.



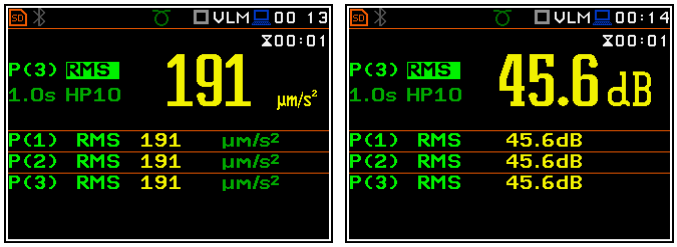
Display Scale windows in Sound and Vibration modes

Setting the scale of the measurement results presentation – **Scale**

The **Scale** position is accessible only in the case of Vibration measurement modes. Two options are available: **Lin** (linear) and **Log** (logarithmic). In the case of the first one the graphical presentation and the units both are linear. In the latter case the graphical presentation is given in the logarithmic scale and the measurement results are expressed in decibels (the result is related to the values set in the **Reference Level** (*path: <Menu> / Auxiliary Setup / Reference Levels*). In the case of the sound measurements the **Scale** position is not active. All results are presented in the logarithmic scale.



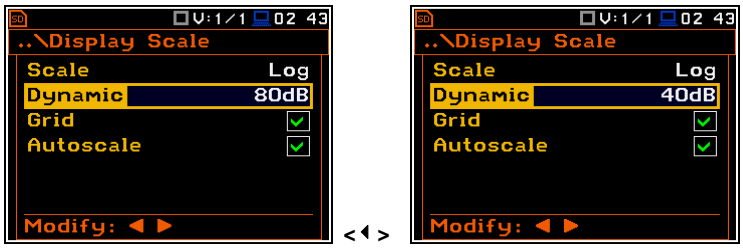
Displays with the possible options of the Scale parameter (Vibration mode)



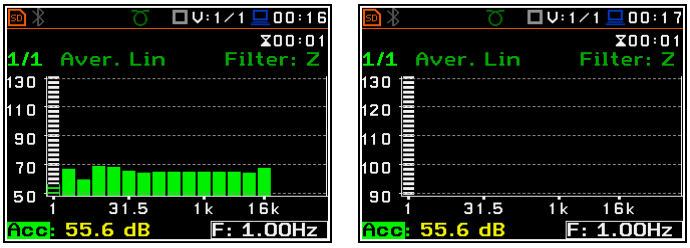
Vibration results presented in linear and logarithmic scale

Scaling the vertical axis of the graphical mode presentation – **Dynamic**

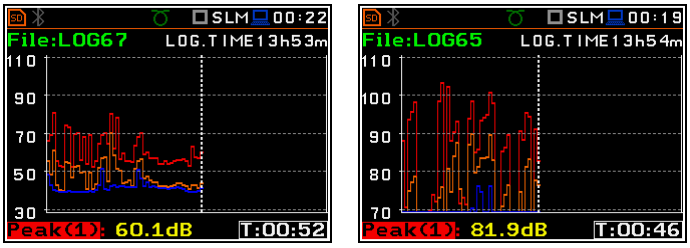
The **Dynamic** position enables the user to select the proper scaling of the graphical mode presentation. In the case of the vertical axis one can obtain the double, four times and eight times expansion (as the default the vertical axis corresponds to 80 dB, after expansion it corresponds to 40 dB, 20 dB and 10 dB – respectively).



Dynamic parameter changing



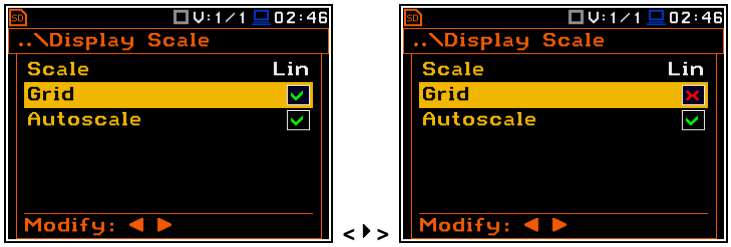
Displays with the 1/1 Octave results presented with different Dynamic parameter (80 and 40 dB)



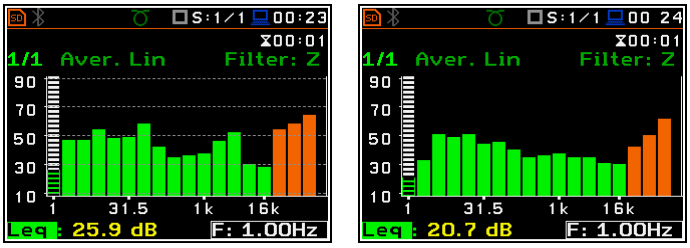
Displays with the results stored in the logger presented with different Dynamic parameter (80 and 40 dB)

Switching on/off the grid in the graphical mode presentation – **Grid**

The **Grid** enables the user to switch on or off the grid in any graphical presentation.



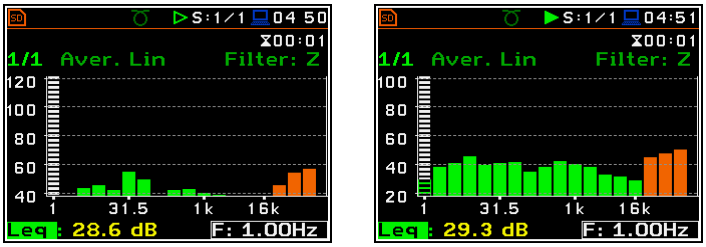
Grid switching off



Displays with the grid switched on and off

Switching on/off the automatic Y-scale adjustment – **Autoscale**

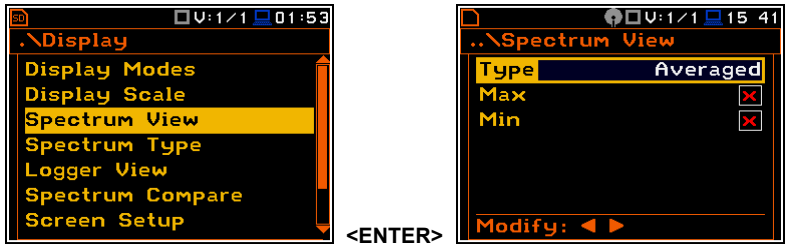
The **Autoscale** position switch on the automatic adjustment of scale Y.



Displays with the Autoscale switched on and off

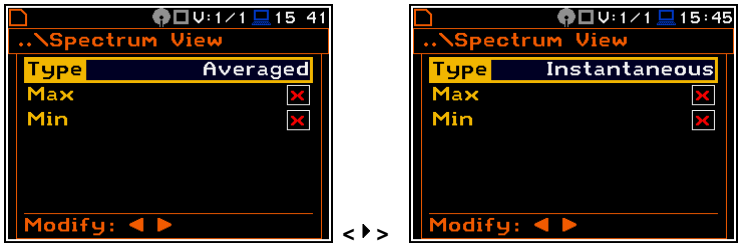
6.3 Setting the parameters of the spectrum presentation - Spectrum View

The **Spectrum View** enables the user to change the type of the spectrum (**Type**) and to activate the presentation on the display the **Max** and **Min** spectrum.



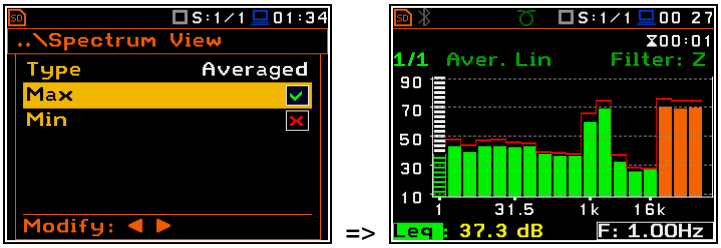
Spectrum View window opening

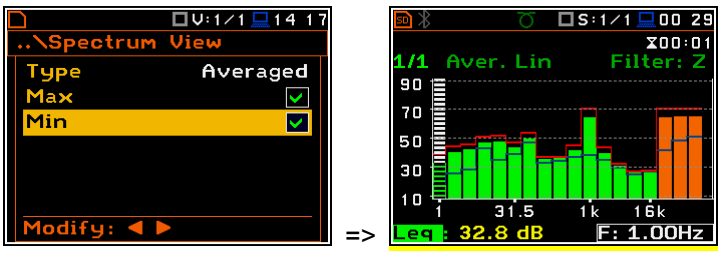
In the **Type** position the user may choose the different spectrum type to be presented on the display in the graphical presentation modes: **Averaged**, **Instantaneous**, **Max** and **Min**.



Spectrum Type selection

The minimum and maximum spectra can be presented at the same plot as main spectrum when **Max** or **Min** parameter is switched on.

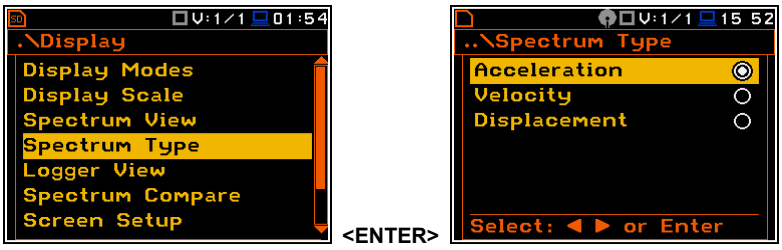




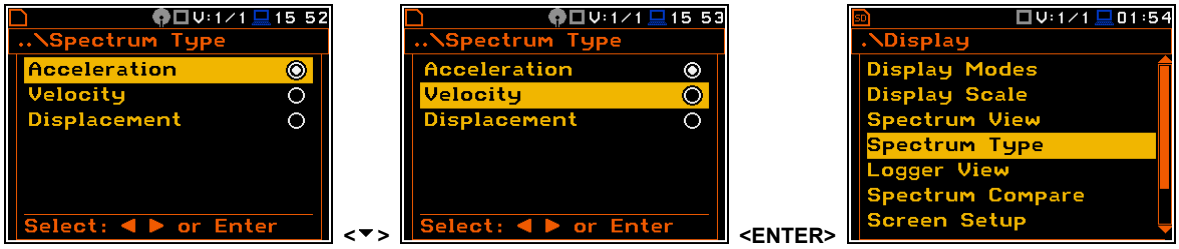
Max and Min spectra presented on the spectrum plot

6.4 Selection of the Spectrum Type in Vibration mode - Spectrum Type

The **Spectrum Type** position is active only in Vibration measurement modes and enables the user to change the spectrum type. This sub-list contains three positions: **Acceleration**, **Velocity** and **Displacement** and is available only in the case of the Vibration measurements.



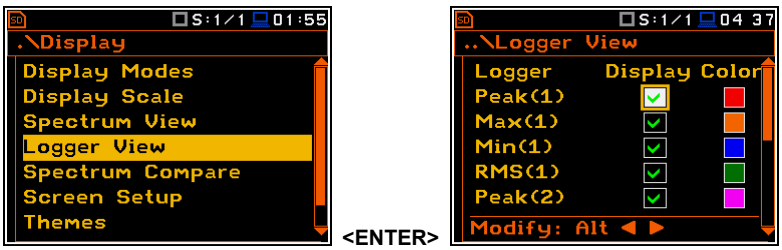
Spectrum Type window opening



Spectrum Type window; Velocity option selection

6.5 Setting the parameters of the logger files presentation - Logger View

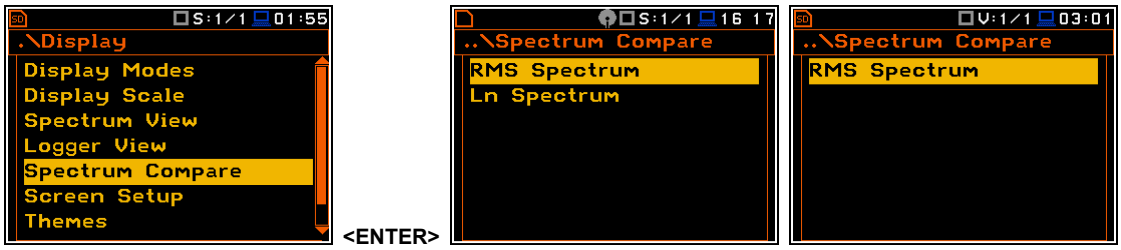
The **Logger View** enables the user to change the colour of the curves for graphical presentation of results, saved in the logger file. In order to enter this window one has to press the **<ENTER>** push-button on the inversely displayed **Logger View** text of the **Display** list.



Logger View window opening for Sound Meter mode and 1/1 Octave function

6.6 Setting the parameter for spectrum comparison – Spectrum Compare

The **Spectrum Compare** enables the user to compare spectrum with the reference one. In order to enter this window one has to press the **<ENTER>** push-button on the inversely displayed **Spectrum Compare** text of the **Display** list.



Spectrum Compare window opening

The **Spectrum Compare** option is available for **1/1 Octave** and **1/3 Octave** analysis. It enables the user to compare two spectra. Both spectra will be presented on the display.

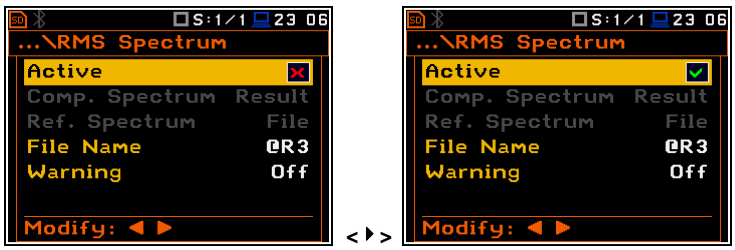
The file with the spectrum assumed as the reference one has to be saved in the instrument's memory. Then the **Spectrum Compare** function should be activated and file with the reference spectrum should be selected in **File Name** position of **RMS Spectrum** window or **LN Spectrum** window if statistics in sound mode are taken into comparison. Then the user has to start second measurement and the spectra from the reference file and the currently calculated will be compared.

Spectrum comparison may be performed in the following way:

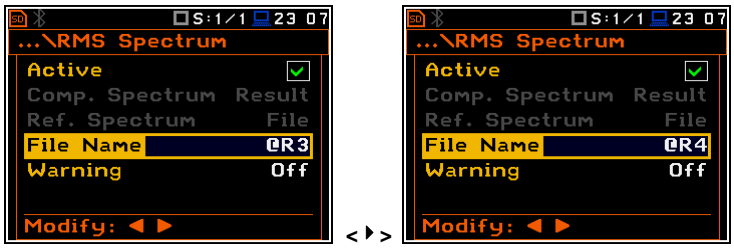
1. Select **1/1 Octave** or **1/3 Octave** measurement function (*path: <Menu> / Function / Measurement Function*).
2. Make proper measurement settings like integration period, measurement range, filter, band etc. (*path: <Menu> / Measurement / General Settings*).

   If statistics are taken into comparison (**LN Spectrum** option available for sound mode for **1/1 Octave** or **1/3 Octave** analysis) the user should activate **Save Statistics** option for both measurements (*path: <Menu> / File / Save Options).*
3. Perform a measurement with reference spectrum and save it.
4. Activate **Spectrum Compare** (*<Menu> / Display / Spectrum Compare* / *RMS (LN) Spectrum)*. Select the file with the reference spectrum in the **File Name** position.
5. Start the second measurement. Press the **< ▸ >** push-button to see spectra on the display.

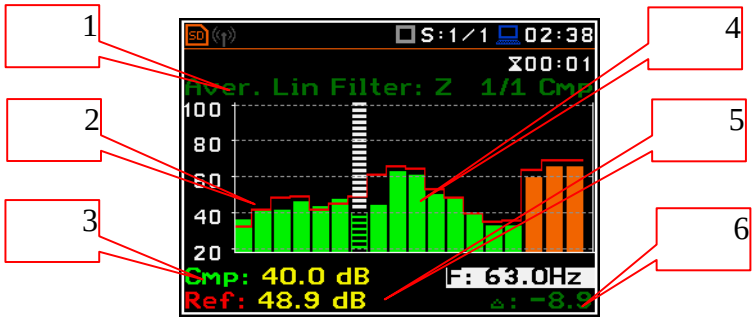
The **Active** position enable to switch on the spectrum comparison option.



RMS Spectrum windows with the Active position



Selected file with saved reference spectrum

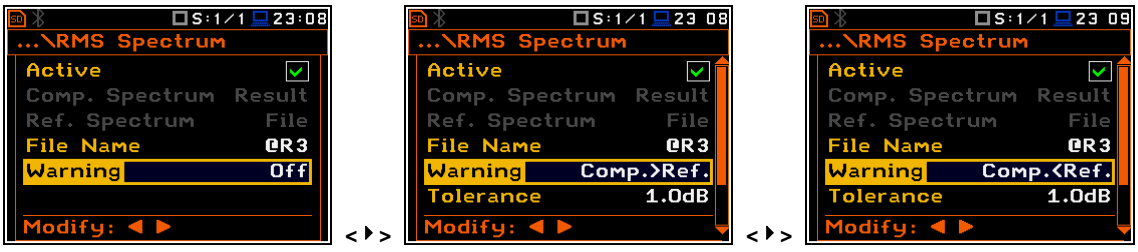


Spectrum comparison presentation mode for 1/1 Octave

Fields description:

1. Spectrum averaging, filer type
2. Reference spectrum
3. Value of the cursor position for compared spectrum
4. Compared spectrum
5. Value of the cursor position for reference spectrum
6. Difference between reference and compared band value

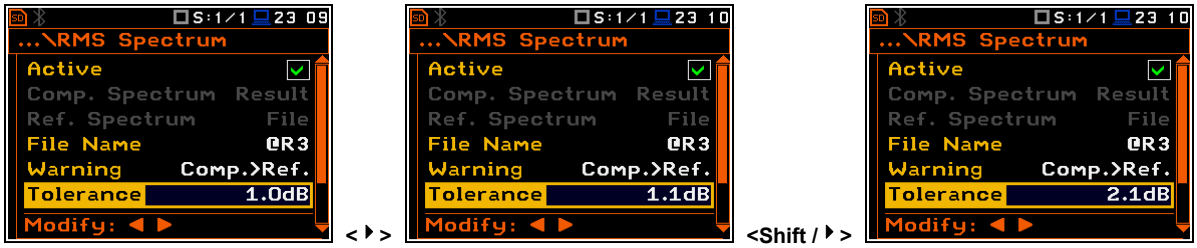
It is also possible to activate **Warning** which will appear on the display when the results from the spectrum which is being compared are greater at the value of **Tolerance** than the results from the reference one (**Comp.>Ref.**) or contrariwise (**Comp.<Ref.**).



RMS Spectrum windows with the Warnings set up

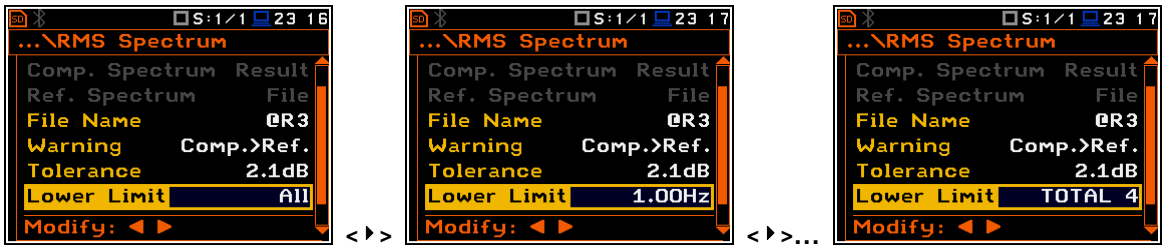
Display with warning that compared results are lower than reference results

The **Tolerance** is to be set from 0.1 dB to 10.0 dB. It means that if the **Tolerance** is set to 1 dB and **Comp.>Ref.** option is selected in the **Warning** position, the message will appear when the calculated spectrum, in any band or line, will be greater than the reference one for more than 1 dB.

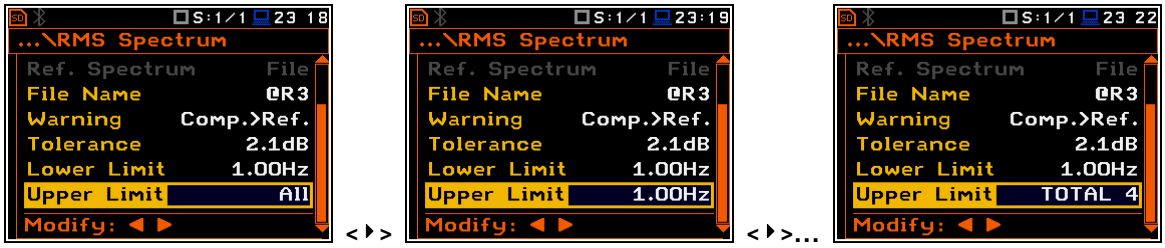


RMS Spectrum windows with Tolerance selection

It is possible also to select epy band of **1/1 Octave** and **1/3 Octave** spectrum for checking warning condition. It can be done by choosing proper values in the **Lower Limit** and **Upper Limit** positions.

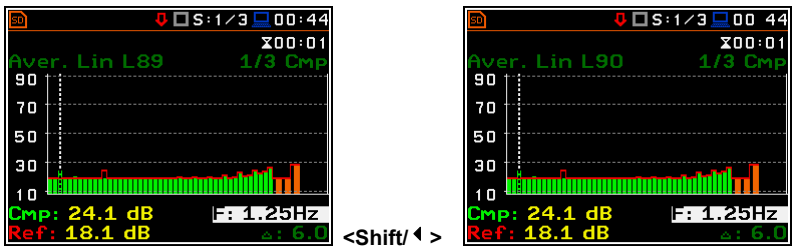


RMS Spectrum windows with the Lower Limit selection



RMS Spectrum windows with the Upper Limit selection

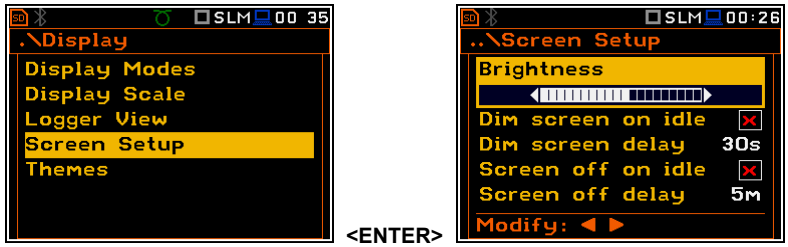
When statistics are being compared (**LN Spectrum**) the spectra comparison for the L90 statistic level appears on the display. Pressing **<Shift/ ◀ >** or **<Shift/ ▶ >** enables one to view the comparison result for lower or higher statistical levels.



Changing the LN Spectrum (L90 to L89)

6.7 Setting the display brightness and power saver- Screen Setup

The **Screen Setup** window enables the user to set the brightness of the display and switch on the screen saver. In order to enter the window one has to press the **<ENTER>** push-button on the inversely displayed **Screen Setup** text of the **Display** list.

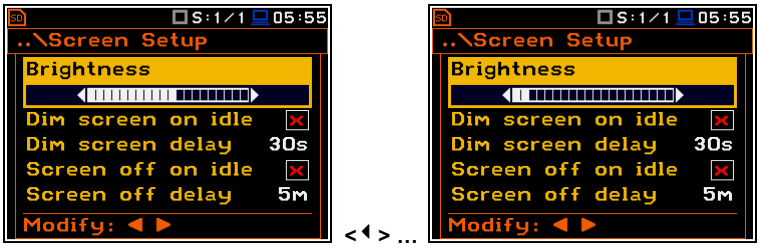


Display list; the Screen Setup window opening

Setting the brightness of the display – **Brightness**

The **Brightness** enables the user by means of the **< >**, **< >** push-buttons to set the proper brightness of the display. The user can select 20 different values of this parameter.

***Notice**: The new value of the brightness is confirmed after each pressing of the < > or < > push-buttons (new value is selected without any confirmation from the **<ENTER>** push-button).*

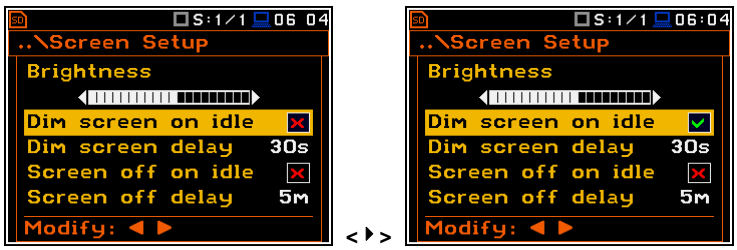


Screen Setup windows; the change of the brightness

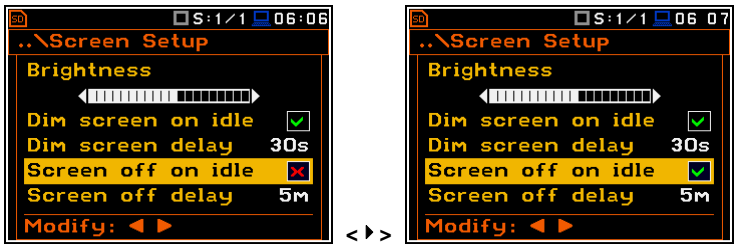
Setting the power saver function

The saving of the internal source of the instrument's power can be achieved by means of reducing the brightness of the screen when possible.

There are two options of power saver function. The screen may be switch off (**Screen off on idle**) and/or dimmed (**Dim screen on idle**). In the case when any of these options is set, after delay, set by parametrs **Dim screen delay** or **Screen off delay**, from pressing any push-button the screen is dimmed or switched off. If it happened, the first pressing of any push-button would cause the switch on of the screen.



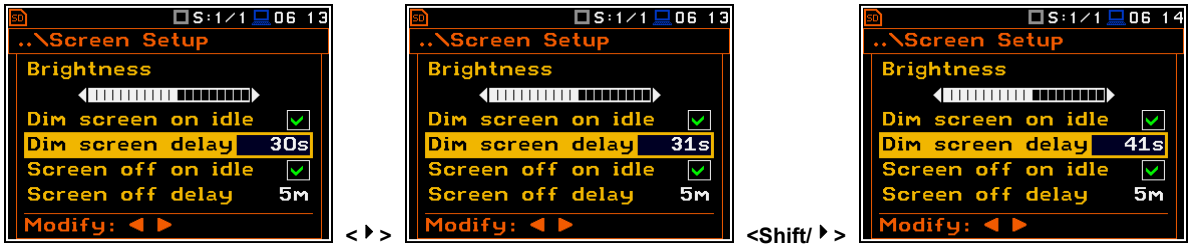
Screen Setup windows; Dim screen on idle selection



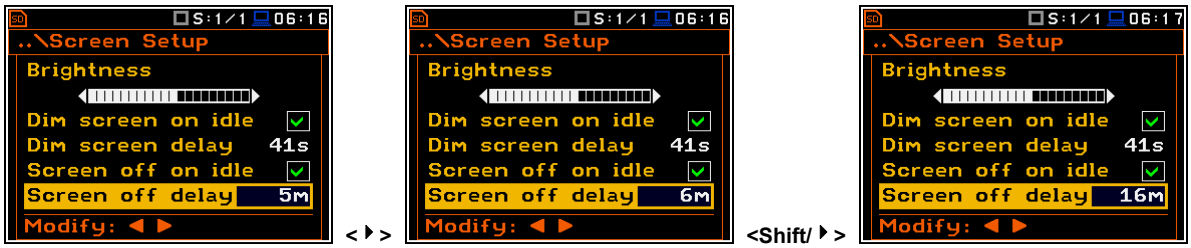
Screen Setup windows; Screen off on idle selection

Setting the power saver delay

The power saver delay defines the delay period from last use of any push-button to the power saver mode. This delay period can be set for **Dim screen on idle** from **5 s** to **60 s** and for **Screen off on idle** from **1 m** to **60 m**. The **<ENTER>** push-button must be pressed for the confirmation of the selection, which closes simultaneously the **Screen Setup** window.



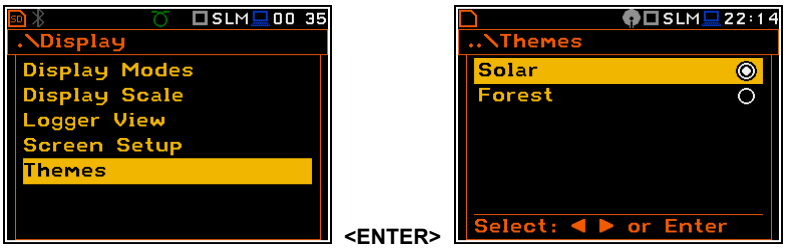
Screen Setup windows; Dim screen delay selection



Screen Setup windows; Screen off delay selection

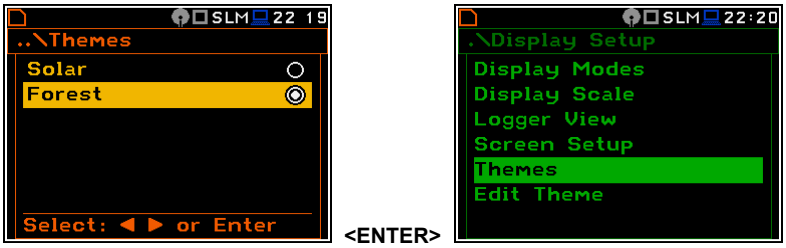
6.8 Setting the colour theme of the display – Themes

The **Themes** window enables the user to set the colour theme of the display. In order to enter the window one has to press the **<ENTER>** push-button on the inversely displayed **Themes** text of the **Display** list.



Display list; the Themes window opening

It is possible to chose between **Solar** and **Forest** themes. Solar theme is presented in this Manual. Forest theme is presented below.



Screen Setup windows; the Power Saver after parameter selection

Notice: *The default colour themes (Solar and Forest) are optimised so to decrease the energy consumption by display. Any other selected by user colour scheme may lead to the energy consumption increase.*

7. SAVING THE MEASUREMENT RESULTS – File

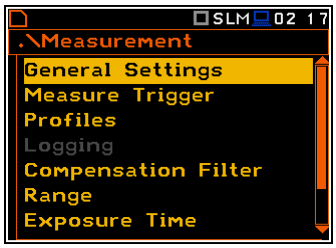
The **File** list contains the elements that enable one to manage the files, created and saved in the internal memory of the instrument or external memory carriers. In order to open the **File** list the user has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**.

The registration of the measurement results is an essential task for the efficient use of the instrument. All available measurement results and also instrument's settings are stored as a file in the internal FLASH type memory of the instrument or on the external memory – **SD Card** or **USB Disk**.

Instrument's files containing data:

- measurement results from **Sound Level Meter**;
- measurement results from **Vibration Level Meter**;
- measurement results from **1/1 Octave** analysis;
- measurement results from **1/3 Octave** analysis;
- measurement results from **FFT** analysis;
- results (measurement history, wave recording, event and marker recording), stored in the logger file;
- setups.

Because of limited internal memory capacity the logger and wave files can be saved on the external memory only. So, if there is no **SD Card** or **USB Disk** connected to the instrument there is no any possibility to create any logger file. In such cases **Logging** position in the **Measurement** list is not active. The **Logging** position became inactive if the internal memory was set as a working directory (see below).



Measurement window with not active Logging position

Result files can be saved manually and automatically, Setup files are saved manually and Logger files are saved automatically.

Each file consists of some elements, which are the same for all kind of files:

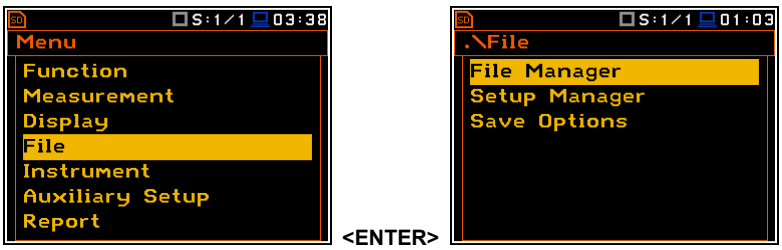
- a file header;
- the unit and software specification;
- the user's text stored together with the measurement data;
- the parameters and global settings;
- the special settings for profiles;
- the marker of the end of the file.

The other elements of the file structure depend on the type of the file (**SLM**, **VLM**, **1/1 Octave**, **1/3 Octave**, logger) and on the setting of **Save Statistics** (*path: <Menu> / File / Save Options / Save Statistics*). These elements are as follows:

- the main results;
- the results coming from **1/1 Octave** analysis;
- the results coming from **1/3 Octave** analysis;
- the results coming from **FFT** analysis;
- the statistics header;
- the results of statistical analysis;

- the header of the statistical analysis performed in **1/1 Octave** or **1/3 Octave** analysis;
- the results of the statistical analysis performed in **1/1 Octave** or **1/3 Octave** analysis;
- the header of the file from the logger;
- the data stored during the measurements in the logger's file.

Notice: *The detailed description of all types of file structures is given in the Appendix B.*



Main list; the File window opening

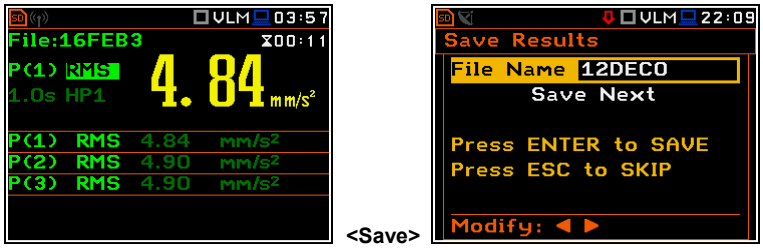
The **File** list contains the following items:

File Manager	enables one to manage the files saved in the instrument's or on external memory;
Setup Manager	enables one to manage the Setup files;
Save Options	enables one to set the options of the measurement result savings.

7.1 Saving files - Save and Save Next

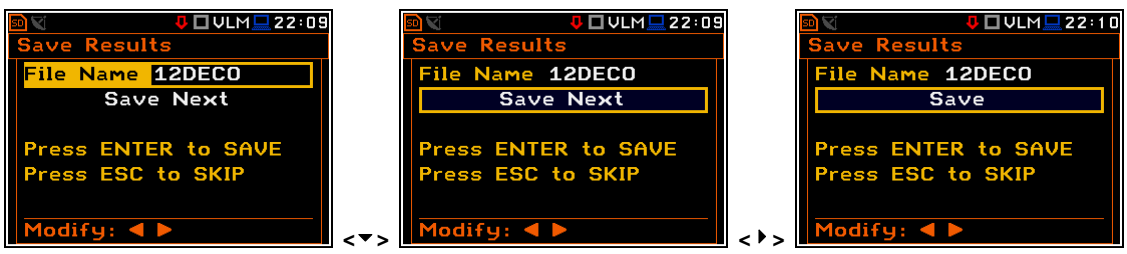
There are two options for storing result data in the internal or external memory. One option is to press **<Save>** push-button right after the measurement performance. Another option is to create **<New File>** in the **File Manager**.

After pressing the **<Save>** push-button the **Save Results** window appears.



Save Results window opening

There are two available functions: the **Save Next** – save a file with the name increased by one, and **Save** – save a file with the edited name. These functions are choosing by means of the **<▲>**, **<►>** push-buttons.

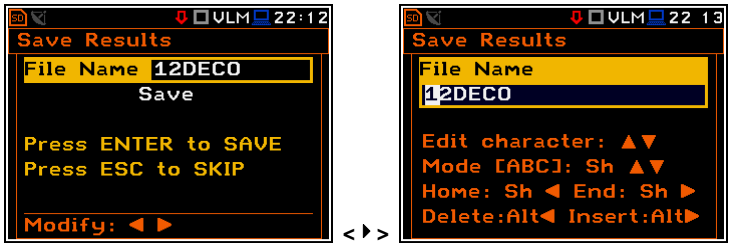


Save Results window; selection the Save Next or Save option

The name of the file, in which the measurements results are to be saved, is displayed above the **Save** or **Save Next** text. The default name for a file is displayed in the case of the first entering to this position (after power on). The default name consists of the day and the month's abbreviation. The name is a combination of ASCII characters and cannot exceeds eight characters.

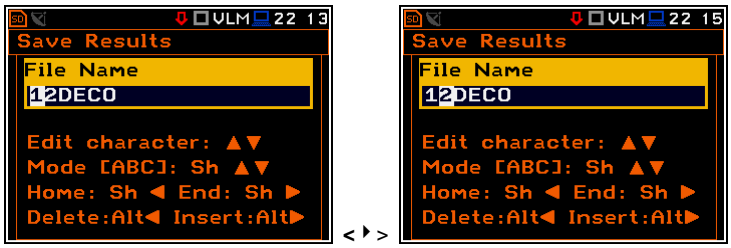
The user can skip the file's name edition and start saving file pressing the **<ENTER>** push-button or return to the **File** list pressing the **<ESC>** one.

To start file edition the user has to select the File name position and to press **<◀>** or **<▶>** push-button. After that the special window with edition function is opening. The edition process is presented on the Figure below.



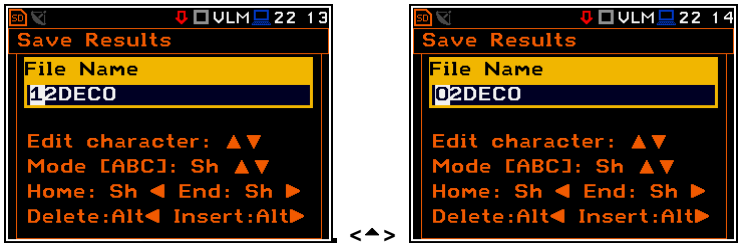
Opening the File edition window

One can select the position of the character in the edited text using the **<◀>**, **<▶>** push-buttons. For the current position the character can be changed, position can be deleted or inserted.



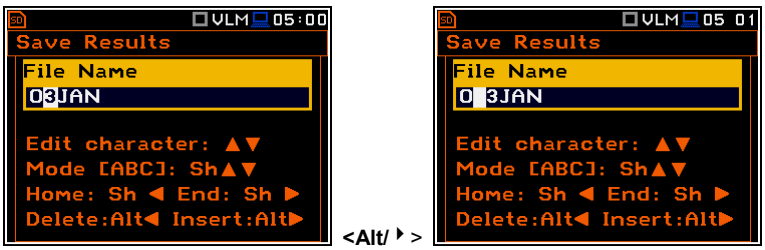
Selection of the character's position to be edited

The available ASCII characters can be changed using the **<▲>** (or **<▼>**) push-button. The subsequent digits, letters and other characters appear on the display in the inversely displayed position after each pressing of the mentioned above push-buttons.



Changing the edited character

One can delete or insert the position in the edited text using the **<◀>**, **<▶>** push-buttons, pressed together with the **<Alt>** one.



Position insertion, deletion

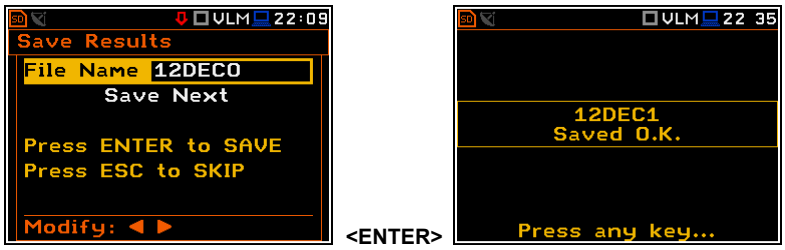
The edited name is accepted and the instrument returns to the **Save Results** window after pressing the **<ENTER>** push-button. The second pressing of the **<ENTER>** push-button saves the file in the working directory. The special warning is displayed in the case the file with the edited name already exists in the memory. The instrument waits then for a reaction of the user (any push-button should be pressed except the **<Shift>** or the **<Alt>** one).

Displays during the attempt of saving the results with the use of Save function when file with the chosen name is the new one a) or already exists in the assigned catalogue

All changes introduced to the file name during the edition are ignored after pressing the **<ESC>** push-button and the instrument returns to the **File** list.

The simplified edition consists in the addition at the end of the file name the natural number. The increase by one of the number is made automatically. After the execution of the saving operation the new file name is displayed and the instrument waits then for a reaction of the user (any push-button should be

pressed except the **<Shift>** or the **<Alt>** one). In the next attempt of saving data, the new name is displayed in the **File Name** line and that name is increased by one during the saving operation.



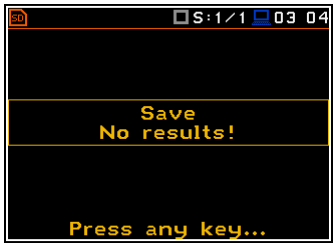
Displays in the simplified edition of the file name and the execution of the saving operation

The number can be changed from 0 to N. The only limitation of the N value is the length of the file name, which cannot be longer than eight characters. In the case, when such limitation is achieved and the instrument can not change automatically the file's name the only possibility is to edit new file name.

Notice: *The files can be overwritten (the use of the same file name) without any warning if the* ***Replace*** *option is switched on (path: <Menu> / File / Save Options / Replace).*

The instrument attempts to save a file after pressing the **<ENTER>** push-button. The saving is not possible in the case when the instrument is measuring the signal. The message "Measurement in progress!" is displayed for about 3 seconds.

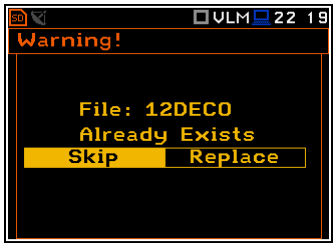
The presented below message is displayed after trying to execute the save operation in the case when no measurements were performed and there are no results to be saved. The instrument then waits for the reaction of the user (any push-button should be pressed except the **<Shift>** or the **<Alt>** one) and after pressing a push-button it returns to the **Save** window.



Display after the Save operation when there were no results for storing

Notice: *During the execution of the* ***Save*** *or* ***Save Next*** *function an additional window is displayed informing about the operation performed. In the case of short files, this window can be unnoticed by the user.*

The presented below display illustrates the situation when during the name edition process the user selected the name, which was used before.



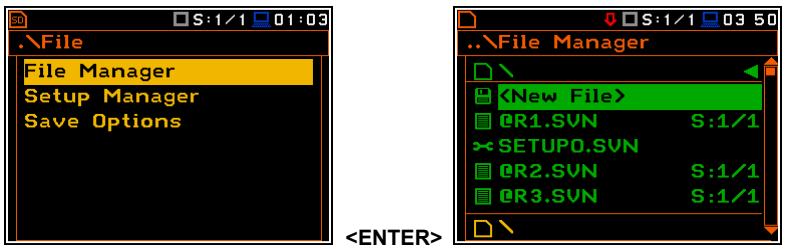
Display after the Save operation when file name already exists

Notice: *The direct access to the* ***Save*** */* ***Save Next*** *function is possible after pressing simultaneously the* ***<ENTER>*** *and* ***<Alt>*** *push-buttons if the* ***Direct Save*** *option is switched off (path: <Menu> / File / Save Options / Direct Save). In another case, (****Direct Save*** *option is switched on) the results are saved, after pressing these push-buttons, in the file with the automatically incremented name.*

Notice: *After the usage of the* ***<ENTER>*** *and* ***<Alt>*** *push-buttons (if the* ***Direct Save*** *option is switched on) the measurement results are saved only once. The following pressing will not cause any instrument's reaction unless next measurement is performed. The same result can be saved in the multiply number of files only using the* ***Save*** */* ***Save Next*** *function.*

7.2 Managing the files saved in the internal and external memory – File Manager

The **File Manager** is used for checking the contents of the memory and make operation on result and logger files such as: open, delete, copy, move, rename, create new files or catalogues and display file and catalogue information.

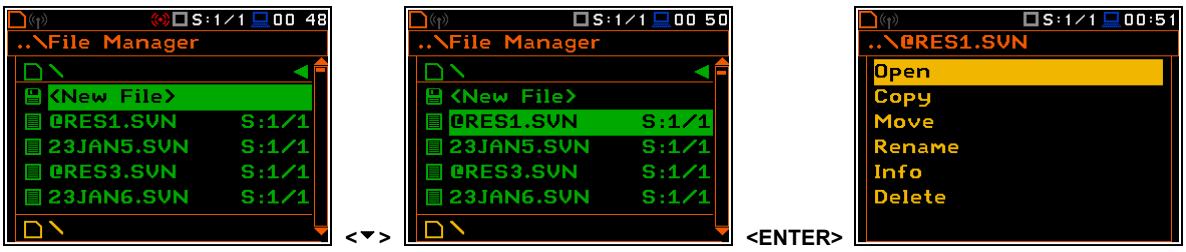


File Manager window opening

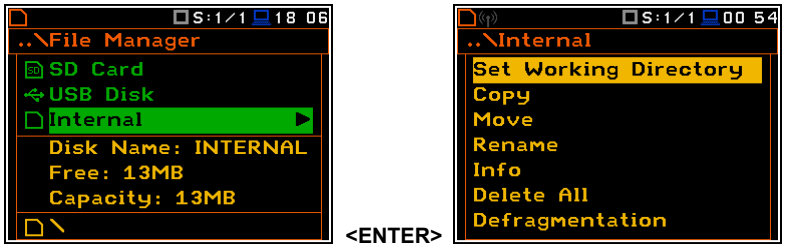
In the **File Manager** window the list of files, catalogues and memory devices is presented. Files are stored in catalogues, which are organised hierarchically. Catalogues names are of capital letters and have no extensions. It is possible to jump through positions in the list by means of the **<▲>**, **<▼>** push-buttons. By pressing the **<ENTER>** push-button the window with the list of available operations is opening for marked (highlighted) position. The window with list of operations is closed and the instrument returns to the **File Manager** list after pressing the **<ESC>** push-button.

When **SD Card** or **USB Disk** is selected the first two positions **<New Directory>** and **<New File>** can be used to create new elements. When **Internal** memory is selected the only **<New File>** position is available.

List of operations for the directory

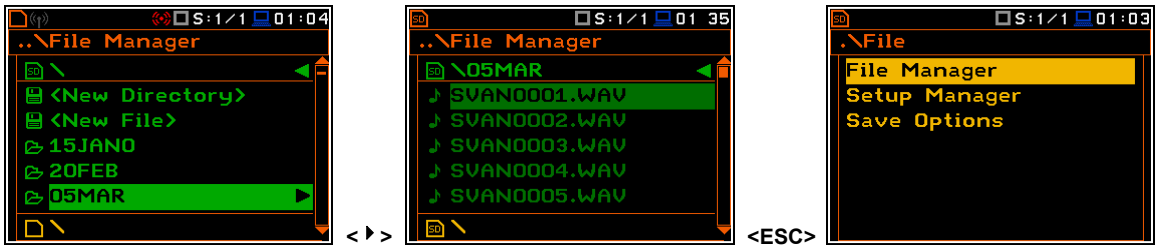


List of operations for the file



List of operations for the Internal instrument memory

When the memory or catalogue is marked (highlighted) then right arrow appears at right side of the line. After pressing the **<▶>** push-button the marked memory or catalogue is opening. The **File Manager** window is closed and the instrument returns to the **File** list after pressing the **<ESC>** push-button.

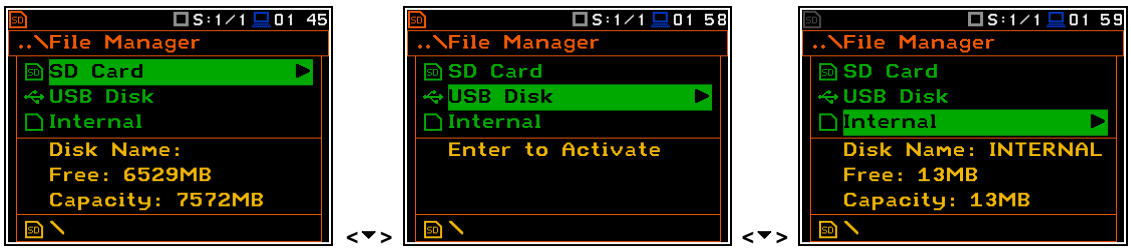


Catalogue opening and returning to the File window

To return to the upper catalogue the user has to press the **<◀>** push-button.

Returning to the upper catalogues

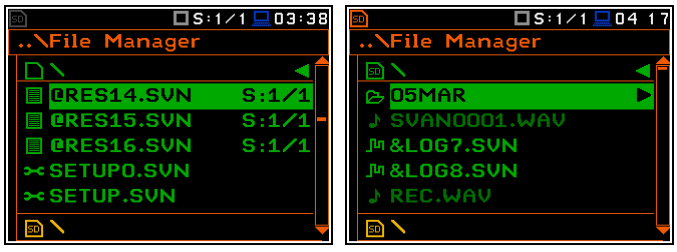
The upper (highest) catalogue contains the names and icons of memories available for files: **SD Card**, **USB Disk** and **Internal**. The description of the memory is presented below the memories list: **Disk Name**, **Free** memory and **Capacity** (total memory space).



Selection of the memory

In the **File Manager** window files are described by file name with extension (SVN or WAV) as well as additional icon and measurement abbreviation (SLM, S:1/1 etc.). The names in which the first character is @ are coming from the **Auto Save** function. Below the table with the description of icons is presented.

	Catalogue icon
	Logger file icon
	Wave file icon
	Result file icon
	Setup file icon
	New file or catalogue



Examples of file lists

7.2.1 Setting the directory for saving files – Set Working Directory

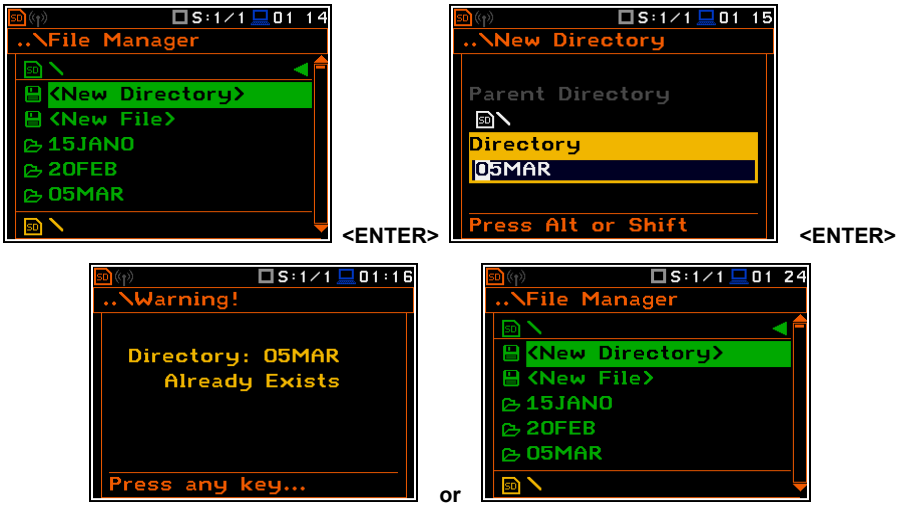
It is possible to assign the catalogue for automatic saving logger files and result files. In order to do this one should choose the required catalogue and press the **<ENTER>** push-button. After opening the list of operations one should press the **<ENTER>** push-button and **Set Working Directory** operation will be

performed. The new catalogue name will appear at the bottom line of the display. Starting from this moment all files will be saved in this catalogue.

Setting the new working catalogue for saving files

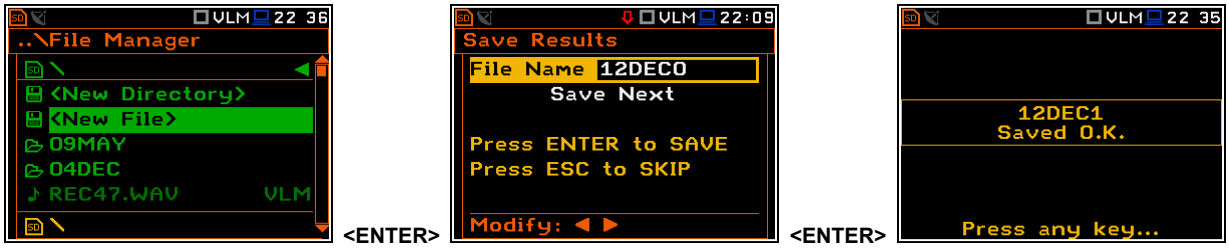
7.2.2 Creating new catalogue and new file

It is possible to create new catalogue in the file system on **SD Card** or **USB Disk**. In order to do this one should enter the catalogue in which the new one will be created and press the **<ENTER>** push-button at the **<New Directory>** position. The proposition of new catalogue name will appear at the bottom line of the display. If there already exists a directory with such name the warning message will appear. In other case this operation will be performed.



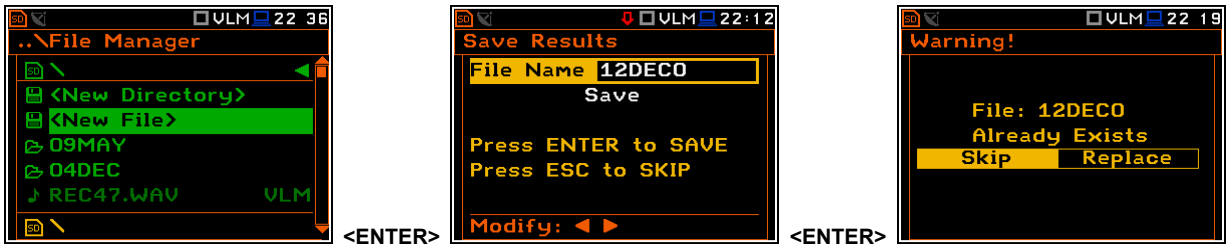
Creating the new catalogue

There is another than pressing the **<Save>** push-button way of saving results as a file in the internal or external memory. This can be done in the **File Manager** window by creating new file in the file system. In order to this one should enter the catalogue in which the new file will be created and press the **<ENTER>** push-button at the **<New File>** position.



Creating the new file

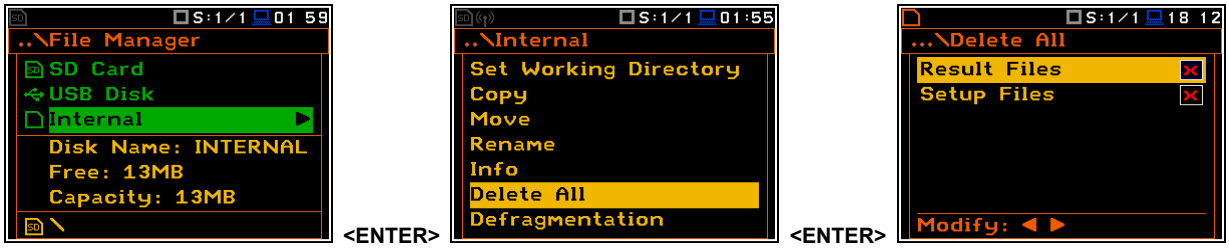
If there already exists a file with such name the warning message will appear.



Attempt to create the new file with existing name

7.2.3 Deleting all files from Internal memory – Delete All

It is possible to delete all result and/or setup files from the **Internal** instrument's memory. In order to do this one should select the **Internal** memory and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Delete All** position and press the **<ENTER>** push-button again. The **Delete All** window with the list of file types will be opened.

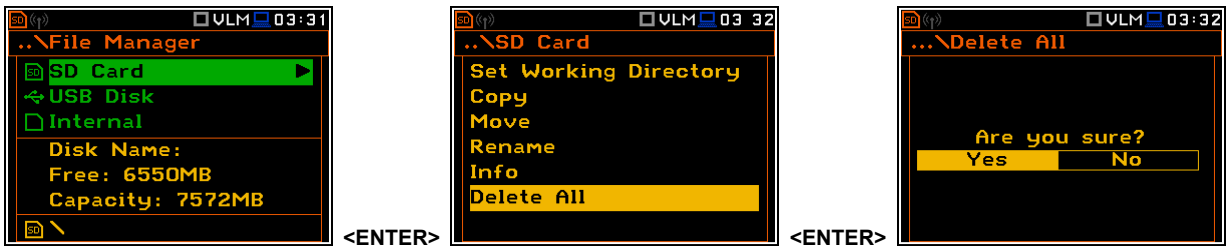


Delete All window for Internal memory

To delete files the user shall mark the desired file type then press the **<ENTER>** push-button.

Result Files deleting

It is possible to delete all files from the **SD Card** and **USB Disk** memory. In order to do this one should select the **SD Card** or **USB Disk** memory and press the **<ENTER>** push-button. In the operation list one should select the **Delete All** position and press the **<ENTER>** push-button again, then confirm the operation.

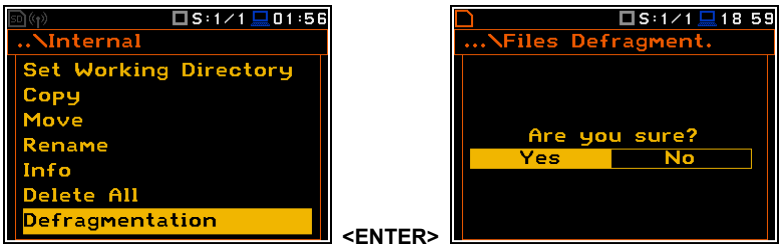


Delete All window for SD Card and USB Disk memory

7.2.4 Defragmentation of the internal memory – Defragmentation

The **Defragmentation** is used to make the **Internal** memory continuous. All new files are saved starting from the beginning of the free memory space. The memory occupied by the deleted file, assuming that the file was not the last one, remains unused for the next files saving. After the removing a file the files memory becomes discontinuous, with unused parts, which cannot be utilized in the future.

The situation changes after the process called defragmentation. During this process, the files saved in the files memory are moved in order to obtain the continuous occupied space.



Defragmentation operation selection

After pressing the **<ENTER>** push-button on the active **Yes** option, the instrument checks whether the used result and Setup files memory is continuous or not. If this memory is continuous, the **Defragmentation** operation is not executed and the special message is displayed. The instrument waits for the reaction of the user (any push-button should be pressed except the **<Shift>** and **<Alt>** one) and after pressing a push-button it returns to the **Defragmentation** sub-list.

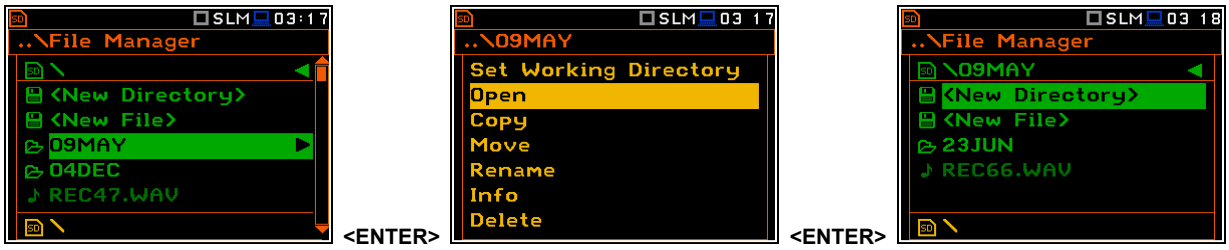
Message in the case when the execution of the Defragmentation operation is unnecessary

If there are conditions to execute the **Defragmentation** operation the current progress of defragmentation is shown on the display. After the successful defragmentation, the special message is displayed and the instrument waits for the reaction of the user. Any push-button should be then pressed except the **<Shift>** and **<Alt>** one. After pressing a push-button, the instrument returns to the **Defragmentation** sub-list.

Execution of the Defragmentation operation

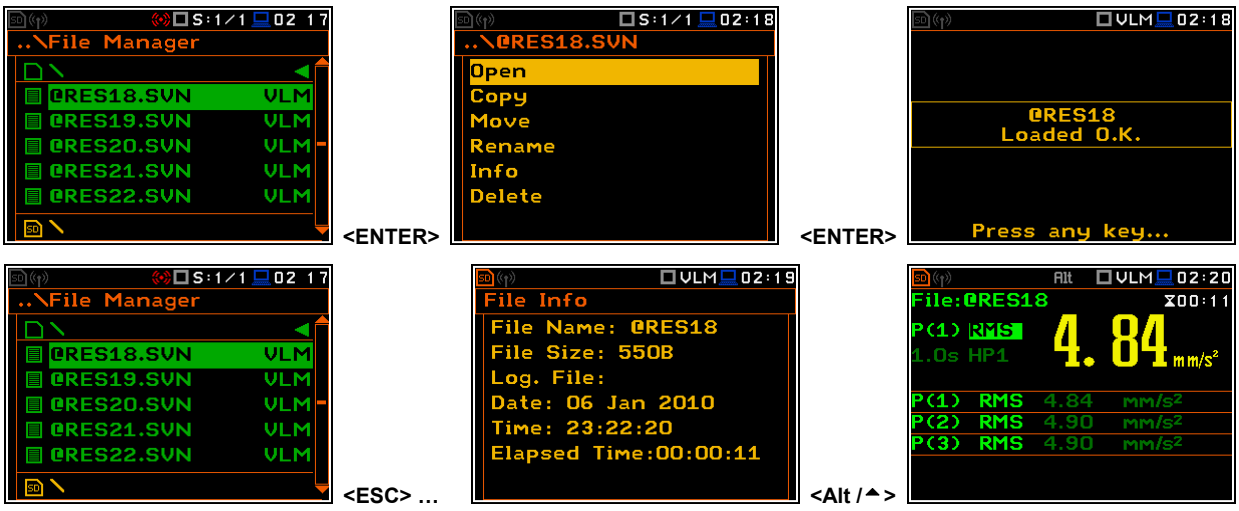
7.2.5 Opening file/catalogue – Open

It is possible to open file or catalogue from the file/catalogue list. In order to do this one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Open** position and press the **<ENTER>** push-button again. The effect of such operation for the catalogue is the same as opening the catalogue by means of the **<▶>** push-button.



Opening the catalogue

Opening the measurement file means that the measurement results saved in this file will be loaded to the instrument's operation memory. The results are loading together with all settings, so if the user press **<Start/Stop>** push-button the instrument will continue the measurement with the loaded **Setup**. The settings, loaded together with the measurement results are not saved in the device EPROM memory and are erased after device switching off.



Loading the measurement file and return to the measurement screen with results saved in this file

7.2.6 Copying file/catalogue – Copy

It is possible to copy file or catalogue from the file/catalogue list in one memory type to another or from one catalogue of external memory to another catalogue same memory. It is not possible to copy logger files to the **Internal** memory since this type of memory do not accept such files.

In order to do this operation one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Copy** position and press the **<ENTER>** push-button again. The instrument then will propose to choose the target catalogue for copying. After selection of the target catalogue the user should press the **<ENTER>** push-button. The window with two options will appear: **Copy Here** and **Rename**.

Copying the file to the Internal memory

7.2.7 Moving file/catalogue – Move

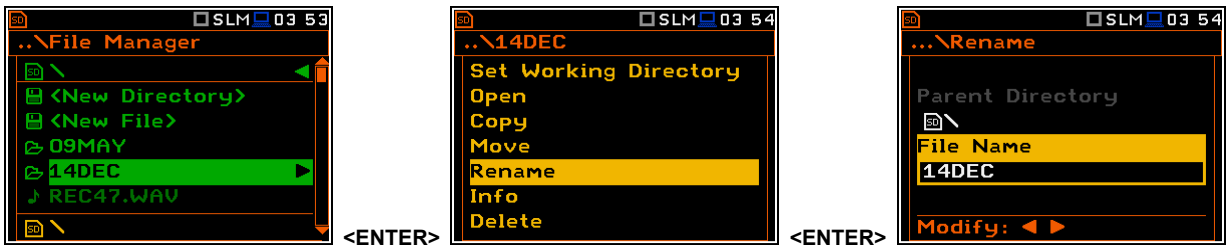
It is possible to move file or catalogue from the file/catalogue list in one memory type to another or from one catalogue of external memory to another catalogue same memory. . It is not possible to move logger files to the **Internal** memory since this type of memory do not accept such files.

In order to do this operation one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Move** position and press the **<ENTER>** push-button again. The instrument then will propose to choose the target catalogue for copying. After selection of the target catalogue the user should press the **<ENTER>** push-button. The window with two options will appear: **Move Here** and **Rename**.

Moving the file from the Internal memory to SD Card

7.2.8 Renaming file/catalogue – Rename

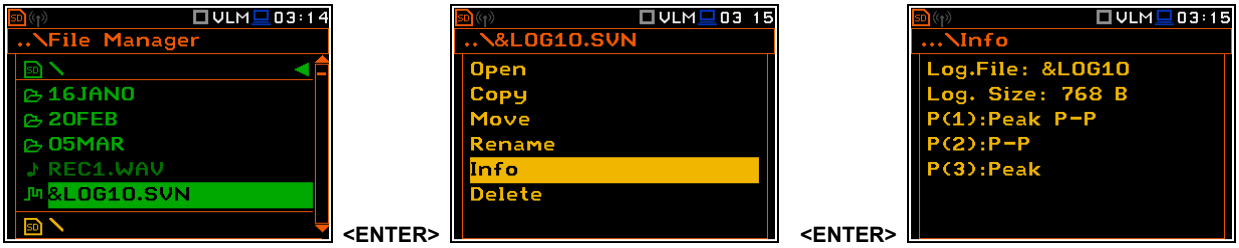
It is possible to rename file or catalogue. In order to do this one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Move** position and press the **<ENTER>** push-button again. The window with text editor function will appear. After edition of the file/catalogue name one should press **<ENTER>** push-button to confirm the changes.



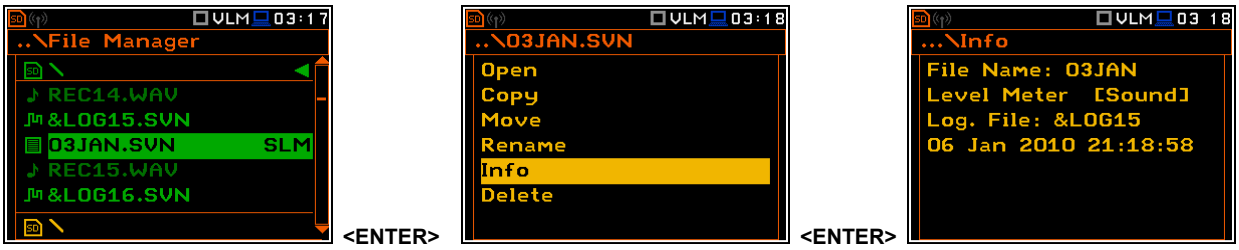
Renaming the catalogue

7.2.9 Information about file/catalogue – Info

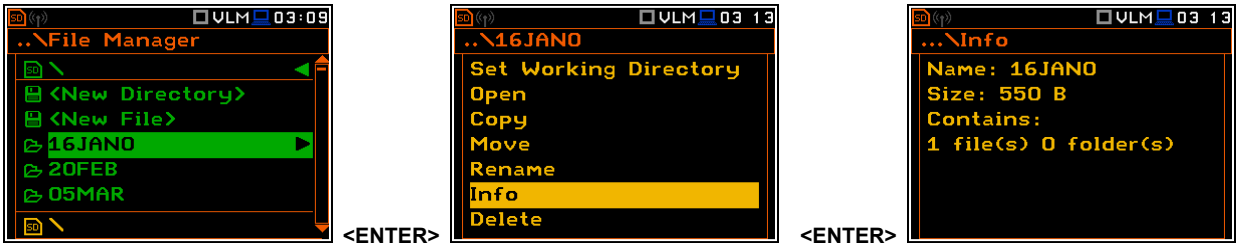
It is possible to get information about file or catalogue. In order to do this one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Info** position and press the **<ENTER>** push-button again. The instrument then will display the information about selected file/catalogue.



Information about logger file



Information about result file

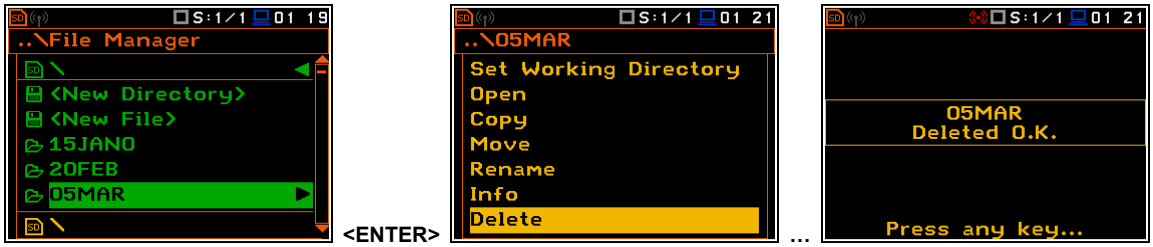


Information about catalogue

7.2.10 Deleting file/catalogue – Delete

It is possible to delete file or catalogue from the file/catalogue list. In order to do this one should select the file/catalogue and press the **<ENTER>** push-button. After opening the list of operations one should select with the **<▲>**, **<▼>** push-buttons the **Delete** position and press the **<ENTER>** push-button again.

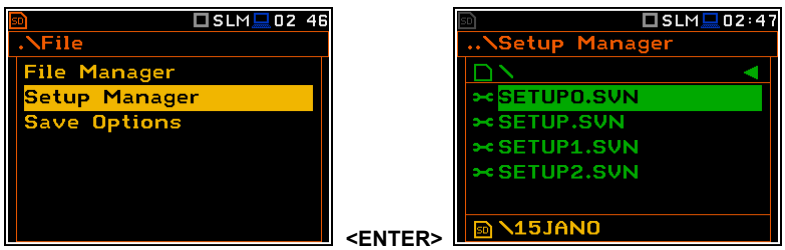
Deleting the file



Deleting the catalogue

7.3 Managing the setup files – Setup Manager

The **Setup Manager** is used for checking the contents of the memory and make operation on Setup files such as: open, delete, copy, move, rename files, create new files and display file information.

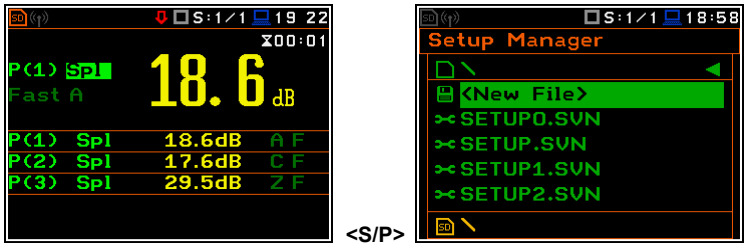


File list; Save Setup window opening

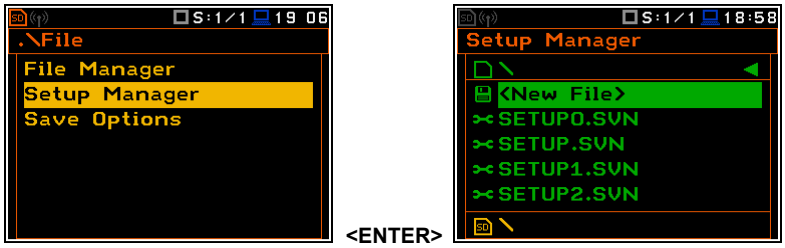
In the **Setup Manager** window only setup files are displayed. Setup files have extension SVN and icon attribute .

7.3.1 Saving the setup files

To store the setup data as a file in the internal or external memory one should open the **Setup Manager** window and push the **<ENTER>** push-button on the **<New File>** position. There are two options to open the **Setup Manager** window. One option is to press **<S/P>** push-button when the measurement is not performed. Another option is to open the **Setup Manager** position from **File** menu.



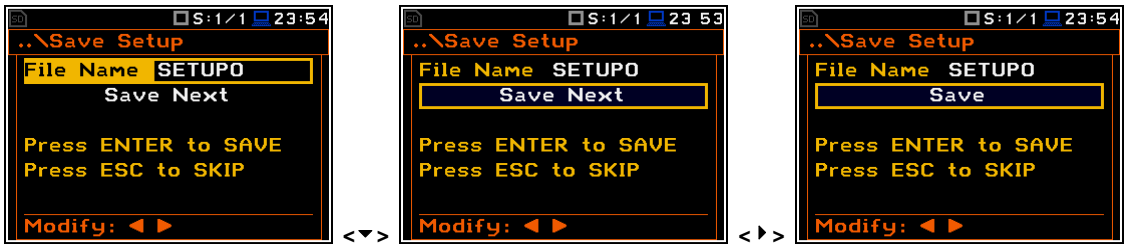
Setup Manager window opening by means of <S/P> push-button



Setup Manager window opening from File menu

In order to save the setup file one should enter the catalogue in which the new file will be created and press the **<ENTER>** push-button at the **<New File>** position. **Save Setup** window is opening then.

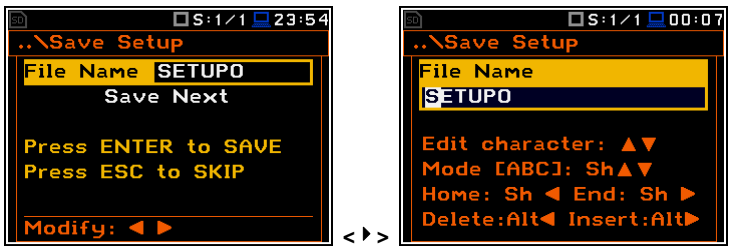
There are two available functions: the **Save Next** – save a setup file with the name increased by one, and **Save** – save a setup file with the edited name. These functions are available after pressing the **< ◀ >**, **< ▶ >** push-buttons.



Save Setup window; save option selection

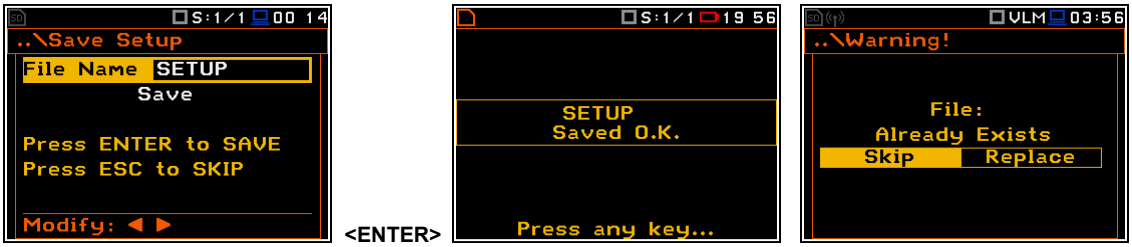
The editable name of the file, in which the setup settings are to be saved, is displayed in the **File Name** position. The default name for a setup file is displayed in the case of the first entering to this position (after power on). The default file name for Setup settings is **SETUP**.

To edit the file name the user has to press the **< ▶ >** push-button. The text edition window is opening.



Display during the selection of the character's position to be edited

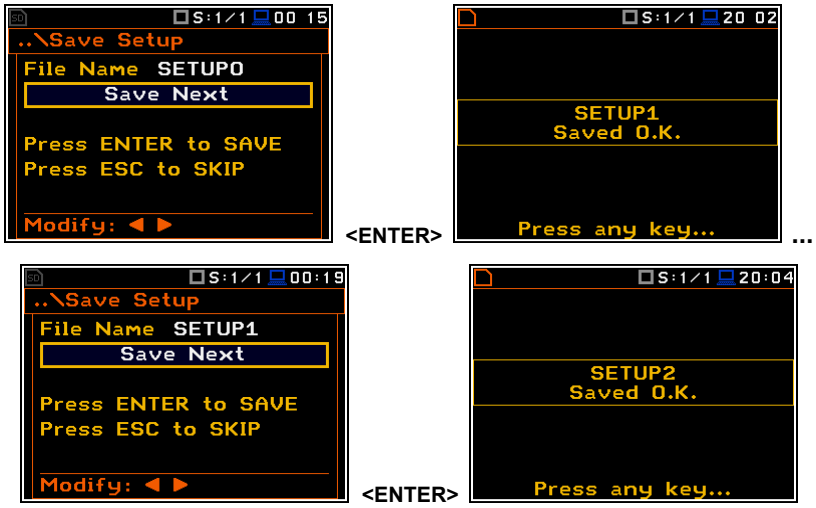
The edited name is accepted and the file is saved after pressing the **<ENTER>** push-button. The special warning is displayed in the case the file with the edited name already exists in the memory. The instrument waits then for a reaction of the user (any push-button should be pressed except the **<Shift>** or the **<Alt>** one).



Setup file saving

All changes introduced to the file name during the edition are ignored after pressing the **<ESC>** push-button and the instrument returns to the **File** list.

The simplified edition consists in the addition at the end of the file name the natural number. The increase by one of the number is made automatically. After the saving operation execution the new setup file name is displayed and the instrument waits then for a reaction of the user (any push-button should be pressed except the **<Shift>** or the **<Alt>** one). In the next attempt of saving data, the new name is displayed in the **File Name** line and that name is increased by one during the saving operation.



Displays in the simplified edition of the Setup file name and saving operation execution

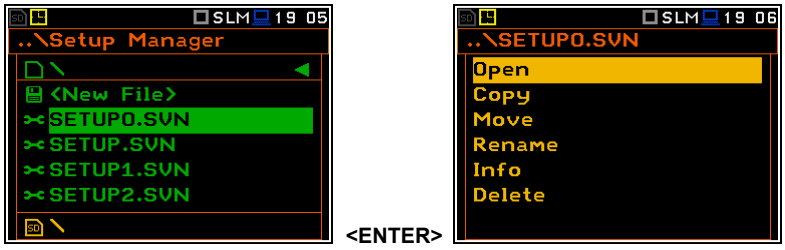
The number can be changed from 1 to N. The only limitation of the N value is the length of the file name, which cannot be longer than 8 characters. In the case when such limitation is achieved and the instrument can not change automatically the file's name the only possibility is to edit new base file name.

The instrument attempts to save a file after pressing the **<ENTER>** push-button. The saving is not possible in the case when the instrument is measuring the signal. The special message is displayed for about 3 seconds in this case and the instrument returns to the **Save Setup** window.

It is not possible to store the data in the file, which already exists, when the **Replace** is not active (☒) (*path: Menu / File / Save Options / Replace*).

7.3.2 Operations on the setup files

The **Setup Manager** enables one to perform operations on the setup files the same way as it was described above for the **File Manager** position. To perform any of operation like: **Open**, **Copy**, **Move**, **Rename**, **Info** and **Delete** one should choose the file for which this operation will be applied and press the **<Enter>** push-button. After that the list of operations opening and one should select with the **<▲>, <▼>** push-buttons the necessary position and press the **<ENTER>** push-button again.

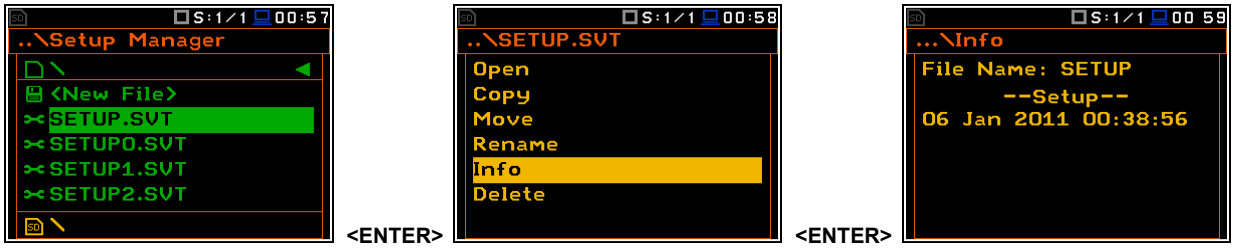


Setup file operations list opening

Opening the setup file means that the settings saved in this file will be loaded to the instrument's operation memory. So if the user press **<Start/Stop>** push-button the instrument will start the measurement with the loaded settings.

Displays after the execution of the Open setup operation

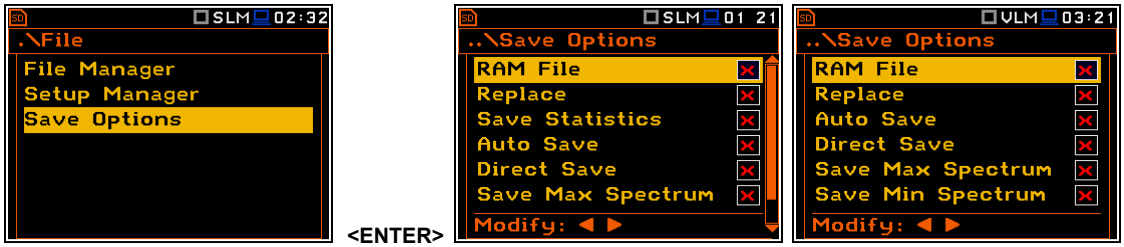
To get information about the setup file one should for selected file press the **<ENTER>** push-button on the **Info** position in the file operations list. . After opening the list of operations one should select with the **<▲>, <▼>** push-buttons the **Info** position and press the **<ENTER>** push-button again.



Displays after the execution of the setup Info operation

7.4 Controlling the data storing in the instrument's memory - Save Options

The **Save Options** sub-list is used for the selection of the options of data storing in the instrument's files.



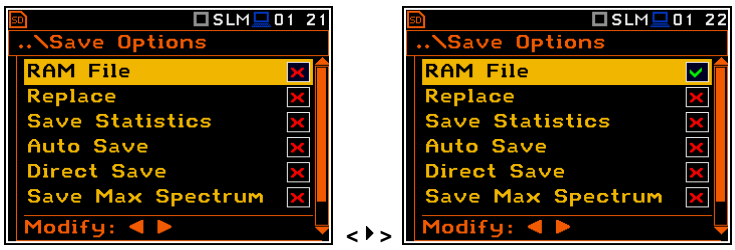
Save Options window opening for Sound and Vibration modes

It is possible to write data into the same part of the memory starting all the time with the same address (**RAM File**), to replace the existing in the memory file by the new with the same name (**Replace**), to add to the results the statistics of the measurements (**Save Statistics**), to save automatically the results of the measurements (**Auto Save**), to save the results with the automatically incremented name (**Direct Save**), to save the maximal values of the spectrum (**Save Max Spectrum**) and to save the minimal values of the spectrum (**Save Min Spectrum**). The position of the sub-list is changed after pressing the **<▲>**, **<▼>** push-buttons. In order to confirm the selection the **<ENTER>** push-button has to be pressed. Such pressing closes also the opened sub-list.

7.4.1 Saving data starting from the same address - RAM File

The measurement data usually are saved in the different files in the flash memory of the instrument. There is also possibility to save data in RAM file starting from the same address. It means that each time the data are saved the previous file is overwritten. This option is useful for the permanent monitoring and remote reading data from the instrument by means of any available interface with the proper period. In order to read data saved in a RAM file one has to use **#4,3** function described in details in App. A.

The **RAM File** is switched on after placing the special character (☑) in the inversely displayed position in the line with the **RAM File** text. The activation or deactivation of the **RAM File** is done by pressing the **<◄>**, **<►>** push-buttons.

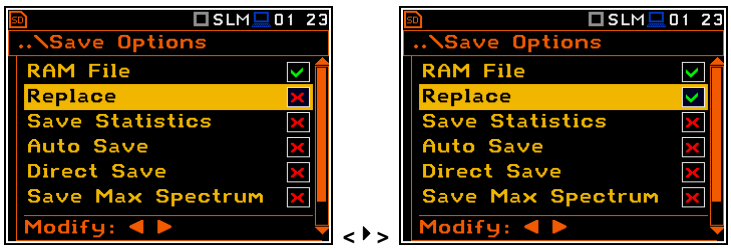


Save Options sub-list; RAM File function activation

The **RAM File** functionality is available only in the **Level Meter**, **1/1 Octave** and **1/3 Octave** mode.

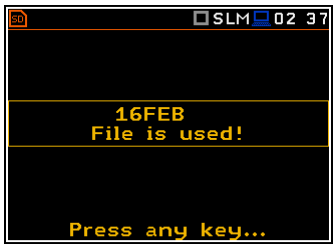
7.4.2 Replacement of the existing files by the new ones – Replace

This option is used in remote mode and for the files created by with the use of **Auto Save** function. The result of the attempt to save the file with the name, which already exists in the memory, depends on the setting of the **Replace**. It is possible to erase the old file and to save the new one with the same name if the position is active (☑). The activation or deactivation of the **Replace** is done by pressing the **< ◄ >**, **< ► >** push-buttons.



Save Options sub-list; Replace function activation

The message is displayed that such operation is not available in the case when this position is not active (☒) – cf. the description of the **Save**. In the other case, the existing file is overwritten.

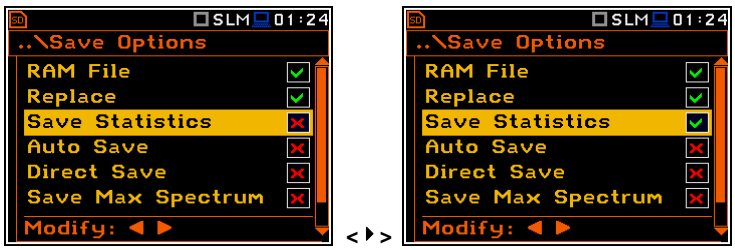


Displays during the file saving when the Replace is switched off and on

7.4.3 Controlling the measurement statistics savings - Save Statistics

The **Save Statistics** is used to set self saving, together with the measurement results, the statistics of the measurements (☑) or to switch off (☒) this possibility. Together with the measurements 100-class statistics are calculated (the values named from **L01** to **L99**). The activation or deactivation of the **Save Statistics** is done by pressing the **< ◄ >**, **< ► >** push-buttons.

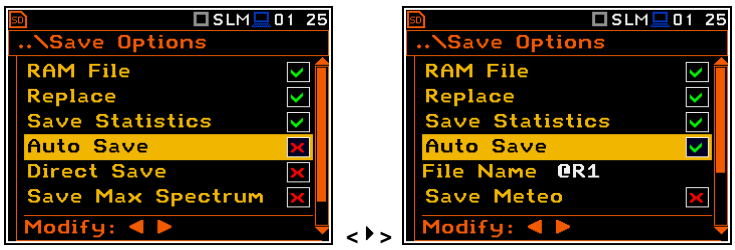
Notice: *This position was created to save the memory of the instrument in the case when the knowledge of the statistics is not necessary. Each registration of the statistics requires 600 bytes of the memory! Ten selected statistic levels are always saved with the main results.*



Save Options sub-list; Save Statistics function activation

7.4.4 Controlling the measurement results savings - Auto Save

Using the **Auto Save** one can set the self-saving of the measurement results (☑) or to switch off (☒) this possibility. The activation or deactivation of the **Auto Save** is done by pressing the **< ◀ >**, **< ▶ >** push-buttons. This position was also established in order not to waist too much memory of the instruments when the self-saving is not necessary.

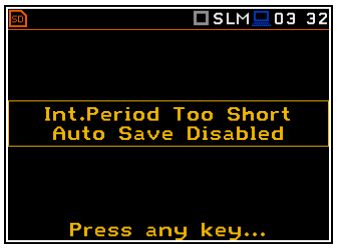


Save Options sub-list; Auto Save function activation

Notice: *The* ***Auto Save*** *function can be performed only in the case when the* ***Integration Period*** *(path: <Menu> / Measurement / General Settings) is not less than 10 seconds. If it is less than 10 seconds, the measurement results are not saved without any indication of that fact! There is only one exception - when the* ***Repetition Cycles*** *(path: <Menu> / Measurement / General Settings) is equal to one, the* ***Auto Save*** *function is executed disregarding the value of the integration period.*

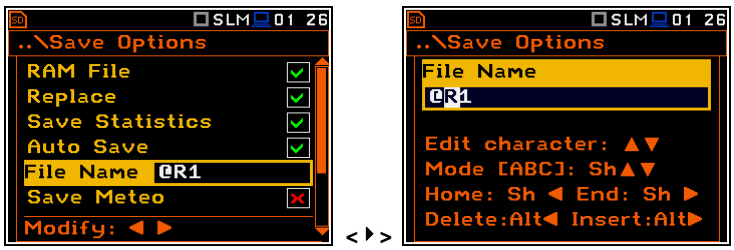
The **File Name** position appears after switching on the **Auto Save** function.

When the integration period is too short for switching on the **Auto Save** option the following message appears on the display:



Display after attempt of switching on Auto Save option with too short Integration Period

To edit the file name the user has to press the **< ▶ >** push-button. The text edition window is opening.



Edition of the auto save file name

Displays when the integration period is too small to activate Auto Save option

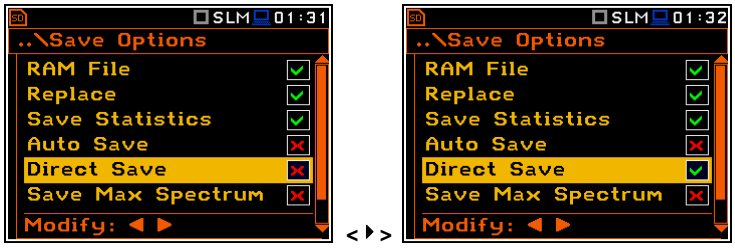
When the **Auto Save** option is active (☑), after starting the measurements by pressing the **<Start/Stop>** push-button the results are saved in the file with the selected name.

Another measurement is started after next pressing of the **<Start/Stop>** push-button. The measurement is stopped after the selected **Integration Period** (*path: <Menu> / Measurement / General Settings / Integration Period*). The names of the next saved files are automatically incremented by one. The same remarks are valid in this case as it was already stated in the description of the **Save Next** function.

7.4.5 Direct access to the Save / Save Next function - Direct Save

The **Direct Save** enables one to select the instrument's reaction on the simultaneous pressing of the **<ENTER>** and **<Alt>** push-buttons. If this option is not active (☒), after pressing these push-buttons the **Save** window is accessed (if the measurements are not performed).

If the option is active (☑), after pressing the **<ENTER>** and **<Alt>** push-buttons the results are saved in the file with the automatically incremented name.

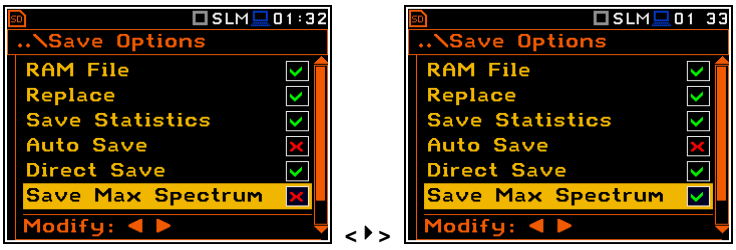


Save Options sub-list; Direct Save function selection

Press the **<ENTER>** and **<Alt>** push-buttons during the execution of the measurements causes, disregarding the option set in the **Direct Save**, that the message "Measurement in Progress" is displayed.

7.4.6 Saving maximum values in the spectrum - Save Max Spectrum

The **Save Max Spectrum** enables the user to save the highest values of the ***Instantaneous*** spectra (calculated with 100-milliseconds time step) in **1/1 Octave** or **1/3 Octave** analysis, which occurred during the **Integration Period**, set in the **Measurement** list (*path: <Menu> / Measurement / General Settings / Integration Period*).

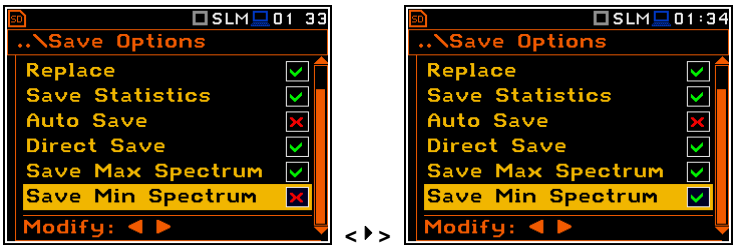


Save Options sub-list; Save Max Spectrum function selection

To see the **Max** values on the display during the real time **1/1 Octave** or **1/3 Octave** analysis measurement the user has to activate the option in the **Display** list (*path: <Menu> / Display / Spectrum View / Max and path: <Menu> / Display / Display Modes / Spectrum:* ☑).

7.4.7 Saving the lowest values in the spectrum - Save Min Spectrum

The **Save Min Spectrum** enables the user to save the lowest values of the **Instantaneous** spectra (calculated with 100-milliseconds time step) in **1/1 Octave** or **1/3 Octave** analysis, which occurred during the **Integration Period**, set in the **Measurement** list (*path: <Menu> / Measurement / General Settings / Integration Period*).



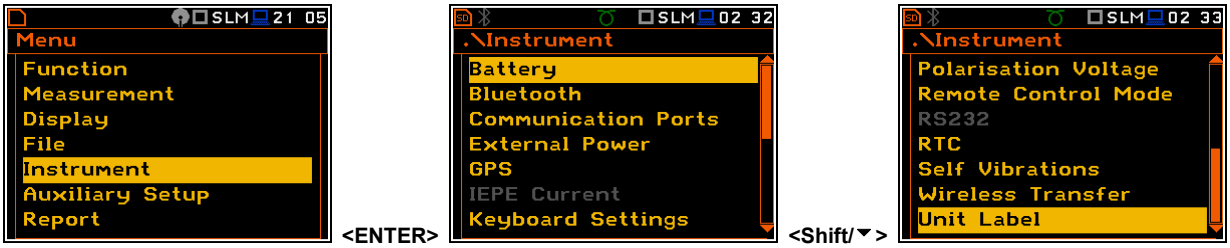
Save Options sub-list; Save Min Spectrum function activation

To see the **Min** values on the display during the real time **1/1 Octave** or **1/3 Octave** analysis measurement the user has to activate the option in the **Display** list (*path: <Menu> / Display / Spectrum View / Min and path: <Menu> / Display / Display Modes / Spectrum:* ☑).

8. SETTINGS OF THE INSTRUMENT PARAMETERS – Instrument

The **Instrument** list contains different sub-lists and positions, which are directly related with the settings of the hardware components of the instrument. In order to open the **Instrument** list the user has to:

- press the **<Menu>** push-button,
- select from the main list, using the **<▲>**, **<▼>** push-buttons, the **Instrument** text,
- press the **<ENTER>** push-button.



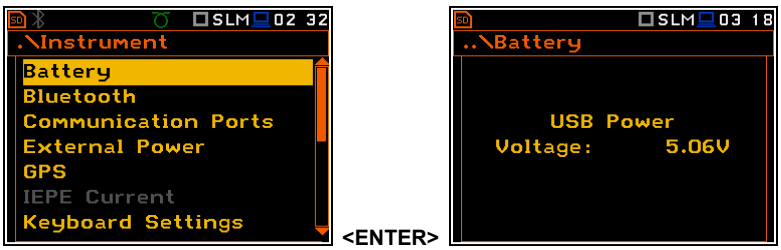
Opening the Instrument position Instrument list

In the **Instrument** list, the following items are available:

Battery	it enables the user to get information about current power source.
Bluetooth	it enables the user to configure the Bluetooth.
Communication Ports	it enables the user to select the active port of the instrument.
GPS	it enables the user to select the time zone and switch on/off the time synchronization.
IEPE Current	it enables the user to choose the current IEPE supply.
Keyboard Settings	it enables the user to set the operating mode of the **<Shift>** and the **<Start/Stop>** push-buttons.
Modem Status	it enables the user to check the status of the modem (position became active when the GPRS function is switched on).
Multifunction I/O	it enables the user to select the available functionality of the I/O port.
Polarisation Voltage	it enables the user to choose polarisation voltage of the instrument's microphone.
Remote Control Mode	it enables the user to configure the Remote Control mode.
RS232	it enables the user to set the transmission speed and the timeout in the RS232 interface.
RTC	it enables the user to set the Real Time Clock.
Self Vibration	it enables the user to check the vibration of the instrument.
Wireless Transfer	it enables the user to select the type of remote communication and packet size for data transmission.
Unit Label	it enables the user to check the type of the instrument, its serial number, the current software versions installed in it and the standards, which the instrument fulfils.

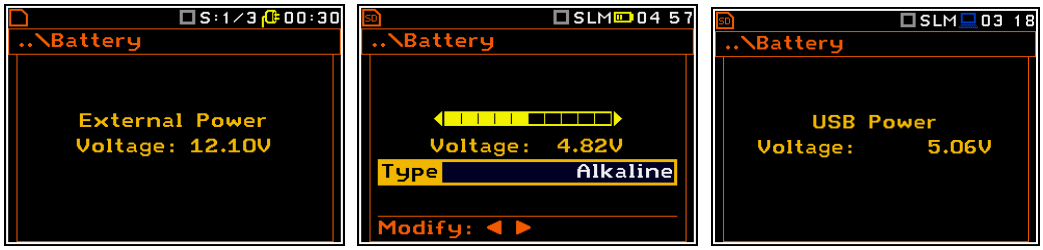
8.1. Checking the state of the internal battery – Battery

The **Battery** enables the user to check the internal battery condition.



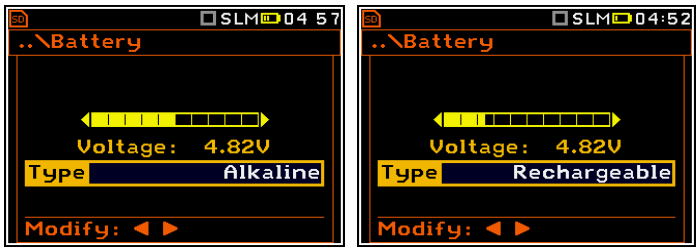
Instrument list; the Battery window opening

The instrument can be powered from the external power supplier, from the external battery pack, from four AA rechargeable or standard batteries or from the USB interface when its USB Device socket is connected by means of the cable to a PC. The view presented on the display for each of three kinds of powering sources is different. The current battery voltage is displayed together with its approximate state (in the graphical form).



Battery windows for different sources powering the instrument

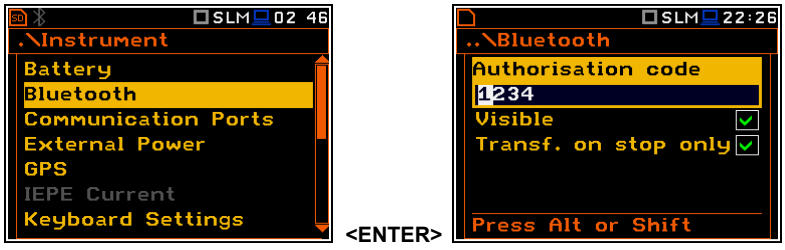
When the instrument is powered from the elements then the user should select their type. It is essential for the right detection of the element's capacity. Two types are available: **Alkaline** and **Rechargeable**.



Battery windows; Type parameter selection

8.2. Bluetooth activation – Bluetooth

The **Bluetooth** enables the user to key in the authorisation code to pair PC and the instrument.



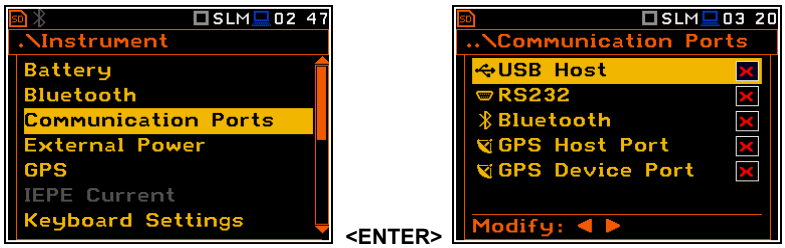
Instrument list; the Bluetooth window opening

If the **Visible** parameter is switched on then during the searching the Bluetooth unit by the PC the instrument will be visible and there will be possible to pair the instrument and the PC. The instrument can communicate with the PC also with not active **Visible** parameter.

If **Transf. on stop only** is switched on then the Bluetooth function is switched off in the instrument during the measurement. Active Bluetooth may be a source of additional internal noise.

8.3. Selection of the active port - Communication Ports

The **Communication Ports** enables the user to select the active communication port of the instrument.



Instrument list; the Communication Ports window opening

It is possible to select next combinations:
– **USB Host** / **Bluetooth** / **GPS Device Port**,
– **RS232** / **GPS Device Port**,
– **GPS Host Port** / **Bluetooth**.

Communication Ports window; ports selection

The socket **USB Host** can be used to serve as the input of the different interfaces: **RS 232** or **USB**. The **RS 232** interface in the **SVAN 97x** instrument is available as a hardware option (a special interface, named as the **SV 55**, with a dedicated microprocessor has to be attached to the socket **USB Host**).

Notice: *The converter **SV 55** serves as the RS 232 interface. The **SV 55** connection to the **USB Host** socket is detected and after successful detection the RS232 icon changes its colour to blue one. The transmission using the **SV 55** is possible only in the case when the instrument is not connected to a PC with the **USB Device** port.*

The USB host interface can be used to control the external USB memory disk with the FAT16 or FAT32 file systems. After USB disc connection the user shall switch on the **USB Host** position.

The USB disk can be disconnected when the measurements are not performed or working directory was set up to **Internal** memory or **SD card**.

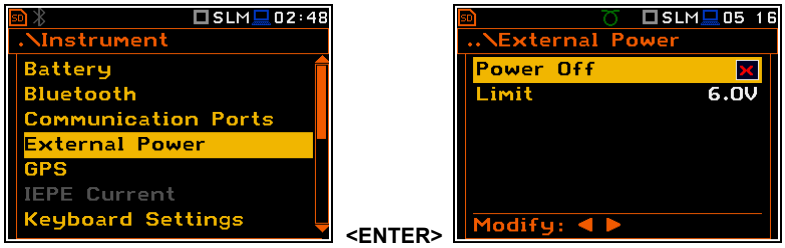
In the USB disk that is divided into partitions its first partition has to serve FAT32 or FAT16 file system. Only short name file (up to 8 characters, similar to DOS system) is implemented. The existing longer names are shortened.

Notice: *The disconnection of the USB disk during the data transmission can cause the lost of data saved in the USB disk as well as in the instrument's internal flash.*

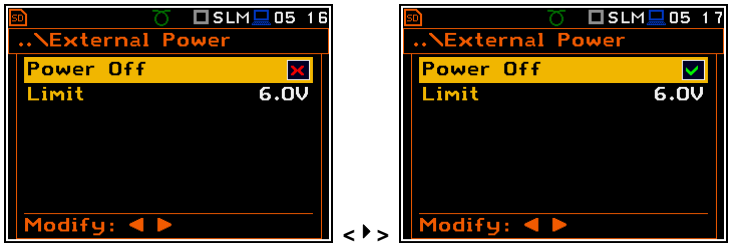
8.4. Setting the external power parameters - External Power

The **External Power** position appears only when the instrument is connected to the external power source (SA15) and enables the user to select the minimum voltage of the external source, when the instrument should be switched off automatically.

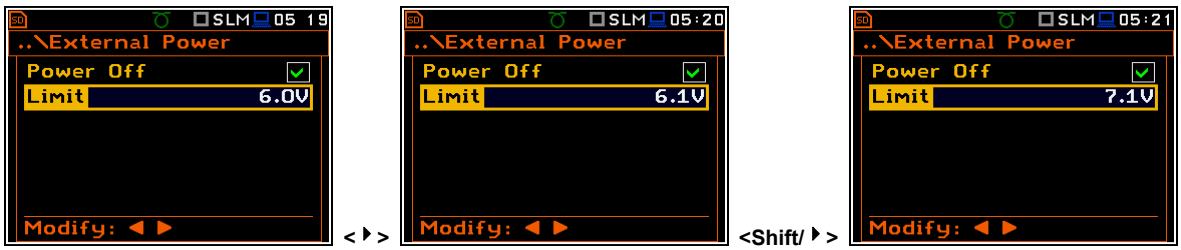
In order to enter the window the user has to select the **External Power** text in the **Instrument** list, using the **<▲>**, **<▼>** push-buttons and press **<ENTER>**.



Instrument list, the External Power window opening



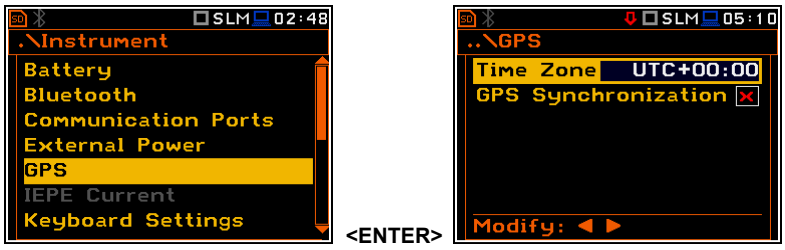
External Power window; Power Off switching on



External Power window; Limit value set up

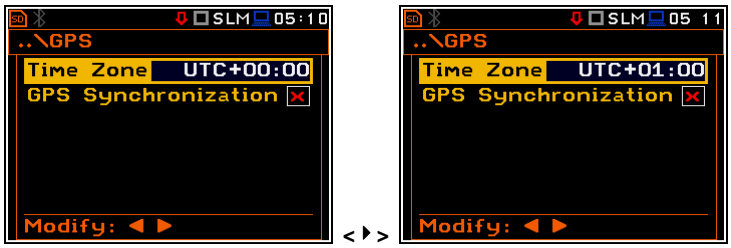
8.5. Setting the GPS parameters – GPS

The **GPS** enables the user to select the time zone and switch on/off the time synchronization.



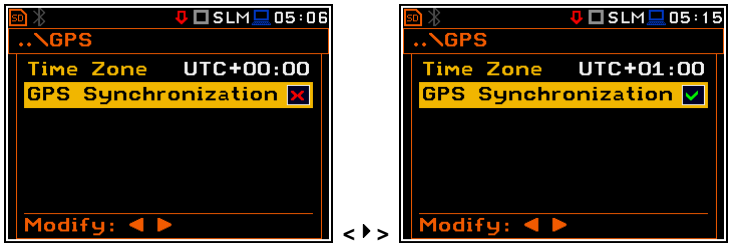
Instrument list, the GPS window opening

The **Time Zone** selection is made by means of the **<◄>**, **<►>** push-buttons.



IEPE Current windows; the Time Zone selection

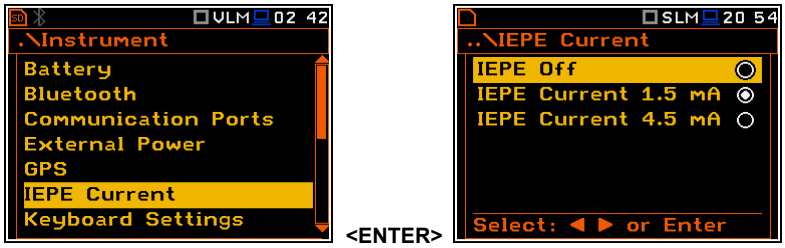
The **GPS Synchronization** is switch on or off by means of the **<◄>**, **<►>** push-buttons.



IEPE Current windows; the GPS Synchronization switching on

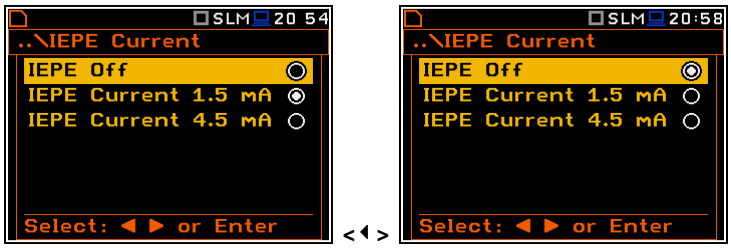
8.6. Selection of the current IEPE supply - IEPE Current

The **IEPE Current** enables the user to choose current IEPE supply.



Instrument list, the IEPE Current window opening

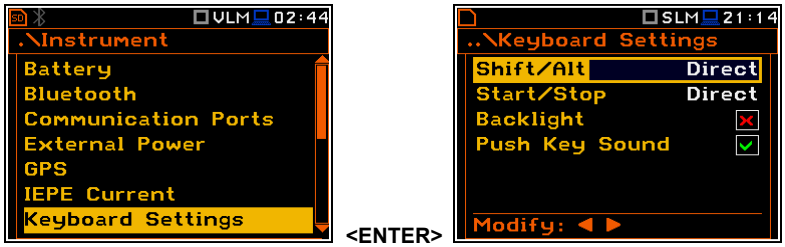
Except **IEPE Off** two options are available: **1.5 mA** and **4.5 mA**



IEPE Current windows; the IEPE off selection

8.7. Selection of keyboard modes – Keyboard Settings

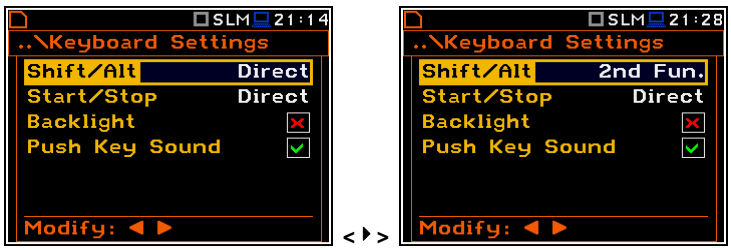
The **Keyboard Settings** enables the user to programme the operation mode of the **<Shift>**, **<Alt>** and **<Start/Stop>** push-buttons and switch on and off backlight and sound options.



Instrument list, the Keyboard Settings window opening

<Shift> / <Alt> push-button working mode selection - **Shift/Alt**

In the **Shift/Alt** position the user can choose between **2nd Fun.** and **Direct**. When the **Direct** option is selected, the **<Shift>** and **<Alt>** push-buttons operates as in the keyboard of a computer – in order to achieve the desired result, the second push-button has to be pressed in conjunction with the **<Shift>/<Alt>** one. When the **2nd Fun.** option is selected the **<Shift>/<Alt>** push-button operates in the sequence with the other one.

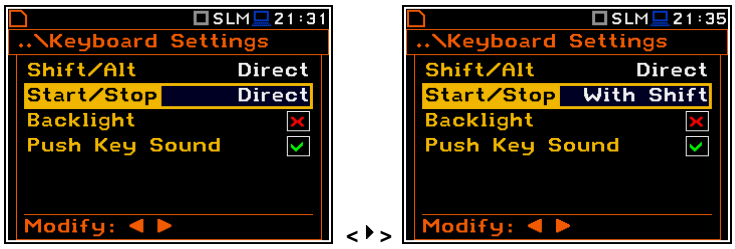


Keyboard Settings windows; the available Shift/Alt settings

<Start/Stop> push-button working mode selection - **Start/Stop**

In the **Start/Stop** position the user can choose between **Direct** and **With Shift**. When the **Direct** option is selected the instrument reacts on each of the **<Start/Stop>** push-button pressing, starting or stopping the measurements.

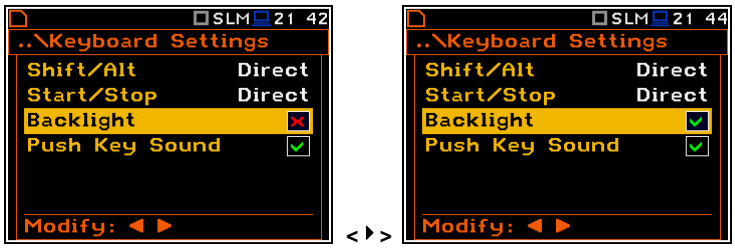
When the **With Shift** option is selected the **<Start/Stop>** push-button operates in conjunction or in a sequence with the **<Shift>** one. The measurements are started or stopped after pressing both push-buttons.



Keyboard Settings windows; the available Start/Stop settings

Backlight mode selection – **Backlight**

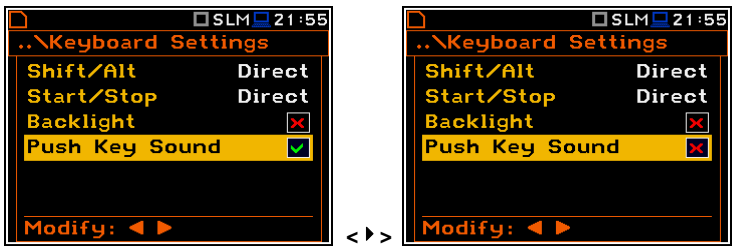
In the **Backlight** position the user can switch on or off keyboard backlight.



Keyboard Settings windows; the Backlight settings

Sound mode selection – **Push Key Sound**

In the **Push Key Sound** position the user can switch on or off keyboard sound.

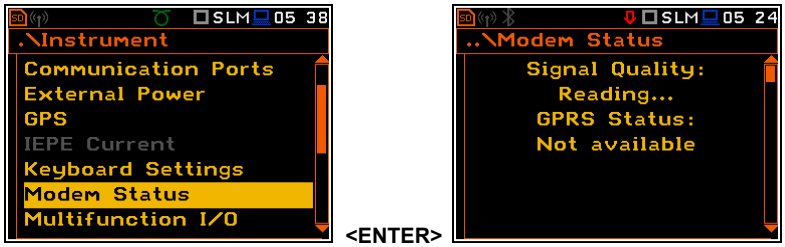


Keyboard Settings windows; the Push Key Sound settings

During the measurement key sound is not active even if it was switched on in the **Keyboard Settings** window.

8.8. Checking the modem status – Modem Status

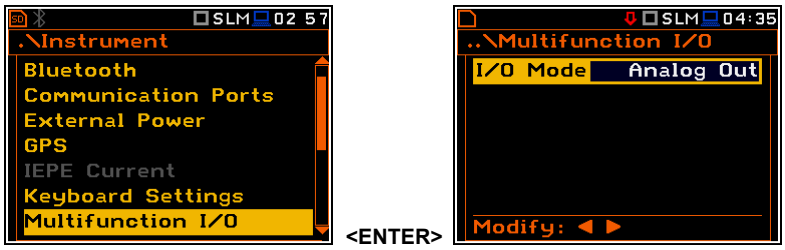
The **Modem Status** position is active only when the GPRS function is switched on (*path: <Menu> / Instrument / Wireless Transfer / Network / GPRS: on*). It enables the user to check the status of the modem.



Instrument list; the Modem Status window opening

8.9. Setting parameters of the I/O port - Multifunction I/O

The **Multifunction I/O** enables the user to select the available functionality of the **I/O** port.



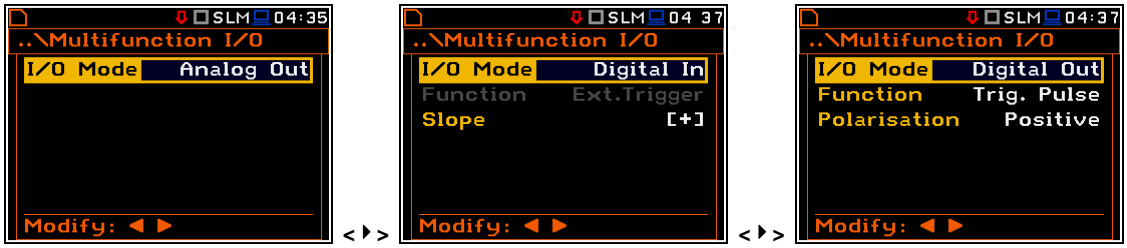
Instrument list, the Multifunction I/O window opening

Mode selection of the I/O port – **I/O Mode**

In the **I/O Mode**, it is possible to select the function of the instrument's socket named as **I/O**. This socket can be used as

- the output of the analogue signal (**Analog Out**) transmitted from the input of the instrument to its output without any digital processing (i.e. filtering),
- the input of the digital signal used as an external trigger to start the measurements (**Digital In**) in the "slave" instrument,
- the digital output (**Digital Out**) used for triggering other "slave" instrument from the "master" one,
- the source of any alarm signal in the case of certain circumstances occurred during the measurements (i.e. the level of the input signal was higher than selected one).

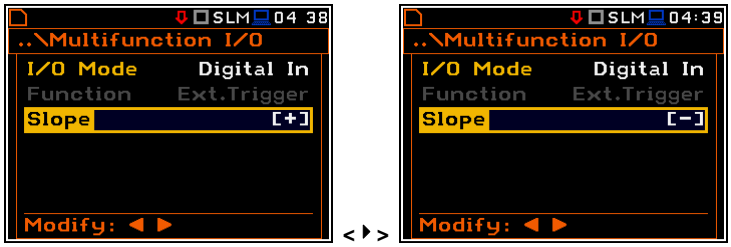
The more detailed description of the **I/O** is given in App. C.



Multifunction I/O windows; the I/O Mode selection

Slope parameter selection for the Digital In mode (Trigger function) – **Slope**

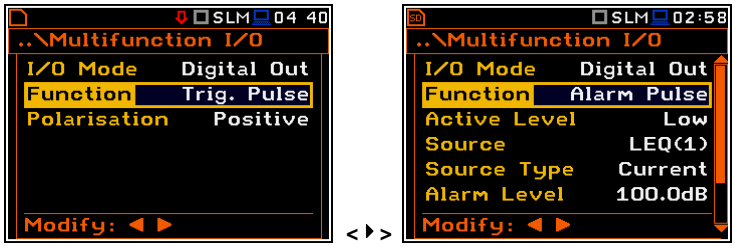
In the case of **Digital In** selection the signal appearing on the **I/O** socket will be treated as the external trigger if the **External** is chosen (*path: <Menu> / Measurement / Trigger / Measure Trigger / Trigger / External*). For **Digital In** mode the only **Ext.Trigger** value is available for the parameter **Function**. It is possible to set up **Slope** as positive **[+]** or negative **[-]** by means of **< ◀ >, < ▶ >** push-buttons.



Multifunction I/O windows; the Slope parameter selection for Digital In option

Digital output function selection of the I/O socket – **Function**

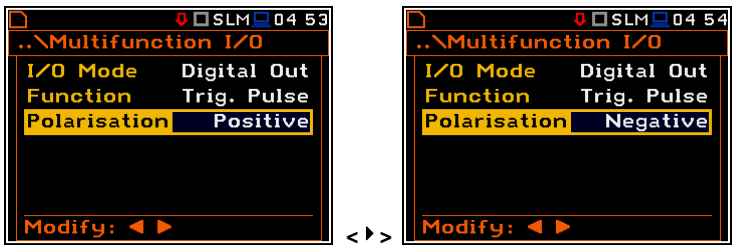
In the **Function** position**,** it is possible to set the function of the digital output of the **I/O** instrument's socket. The socket can be used as the source of the trigger pulse (**Trig. Pulse**) which starts the measurement in another "slave" instrument linked to the "master" one or the alarm signal which appears there after fulfilling certain measurement conditions (**Alarm Pulse**).



Multifunction I/O windows; the Function selection

Polarisation selection of the digital output signal – **Polarisation**

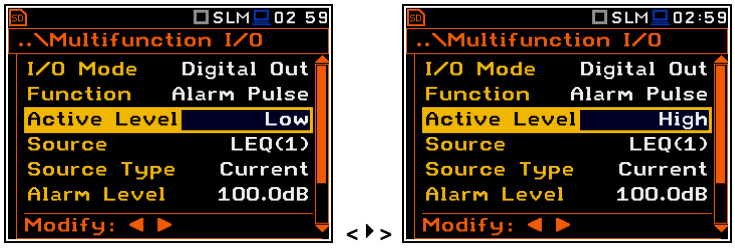
In the **Polarisation** position, it is possible to select which polarisation of the signal (negative or positive) will be valid.



Multifunction I/O windows; the Polarisation selection

Active level selection of the digital output signal - **Active Level**

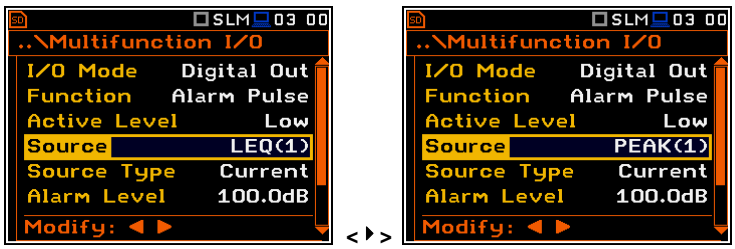
In the **Active Level** position, it is possible to select which level of the signal should be treated as a valid one ("negative" or "positive" logic): **Low** or **High**.



Multifunction I/O windows; the Active Level selection

Source signal selection for the alarm pulse generation – **Source**

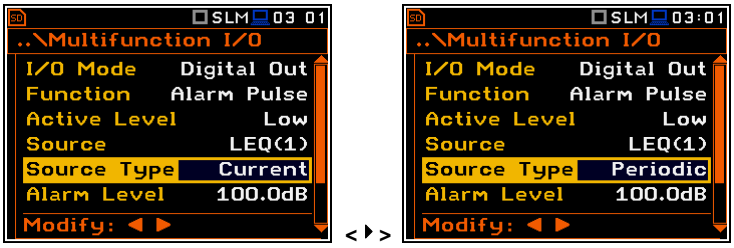
In the **Source** position, it is possible to select the measurement result which level should be checked. If the measured result level is greater than selected alarm level – the instrument will generate alarm signal on the **I/O** socket. The measurement results from the first profile: **PEAK(1)**, **SPL(1)**, **Max(1)** or **LEQ(1)** can be used for the purpose described above.



Multifunction I/O windows; the Source selection

Selection of the alarm source type – **Source Type**

In the **Source Type** position, it is possible to select the type of alarm source. Available types are: **Current** and **Periodic**.

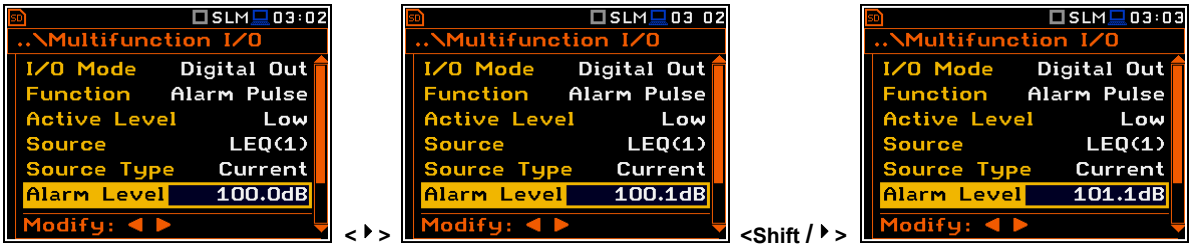


Multifunction I/O windows; the Source Type selection

Alarm level selection on the digital output of I/O - **Alarm Level**

In the **Alarm Level**, it is possible to set the level of the result to be monitored during the measurements. If the result is greater than the one set in this line, the instrument will generate the alarm signal in the selected logic. The available levels are within the range [30.0 dB, 140 dB].

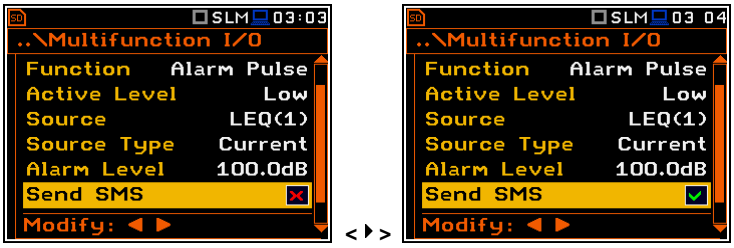
The **Alarm Level** current value decreasing / increasing by 0.1 dB is possible by means of the **<◄>** / **<►>** push-buttons. The step can be decreased / increased up to 1 dB after pressing simultaneously the **<◄>** / **<►>** push-buttons with the **<Shift>** one.



Multifunction I/O windows; the Alarm Level setting

Switch on or off the SMS message in case of alarm – **Send SMS**

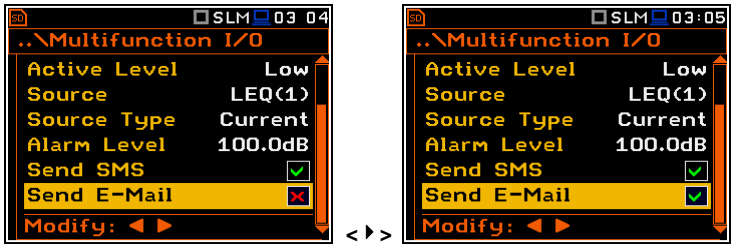
When the alarm is generated during measurement it is possible to send SMS message to the phone number, defined in **SMS Option** window (*path: <Menu> / Instrument / Wireless Transfer / SMS Options).* The position is switch on (☑) or off (☒) by means of the **<◄>**, **<►>** push-buttons.



Multifunction I/O windows; the Send SMS option setting

Switch on or off the E-mail message in case of alarm – **Send E-Mail**

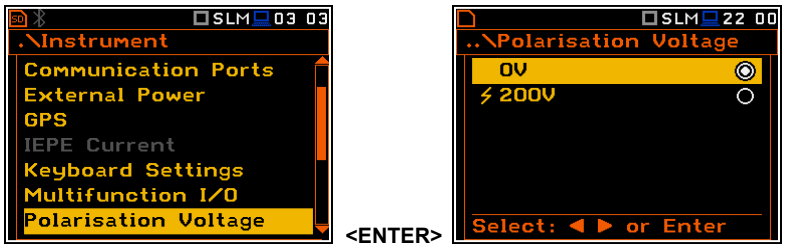
When the alarm is generated during measurement it is possible to send E-mail message to the address, defined in **E-mail Settings** window (*path: <Menu> / Instrument / Wireless Transfer / E-mail Settings).* The position is switch on (☑) or off (☒) by means of the **< ◀ >**, **< ▶ >** push-buttons.



Multifunction I/O windows; the Send E-Mail option setting

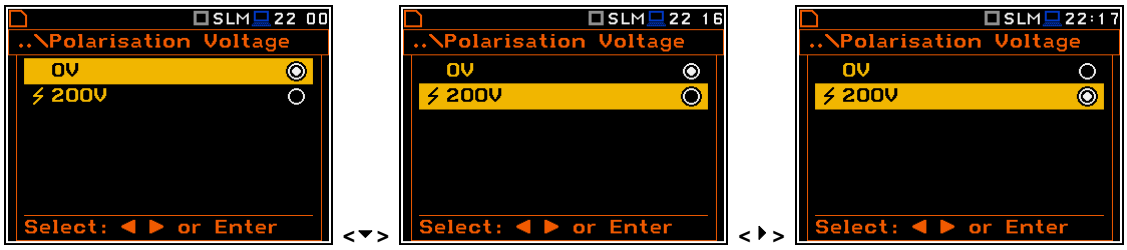
8.10. Setting the microphone polarisation voltage – Polarisation Voltage

The **Polarisation Voltage** enables the user to choose polarisation voltage of the instrument's microphone.



Instrument list; the Polarisation Voltage window opening

Two options are available: **0V** and **200V**. The selection is made by marking the required position by means of the **< ◀ >**, **< ▶ >** push-buttons.

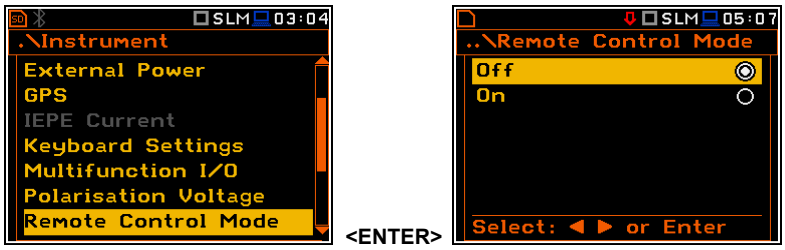


Polarisation Voltage selection

8.11. Remote control mode configuration – Remote Control Mode

The **Remote Control Mode** enables the user to activate Remote Control mode in which messages that require manual action from the user will stop being shown after 5 seconds. This mode is helpful when the instrument is configured for remote monitoring during which there is usually no one present to control the

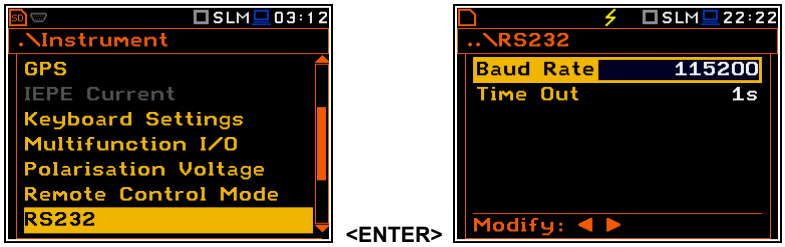
instrument manually. By enabling Remote Control mode, the instrument's normal operations will not be interrupted by the displaying messages.



Instrument list; the Remote Control Mode window opening

8.12. Setting the parameters of the serial interface - RS232

The **RS232** enables the user to programme the RS 232 interface transmission speed (**Baud Rate**) and to set the time limit before which the interface operation should be performed (**Time Out**).

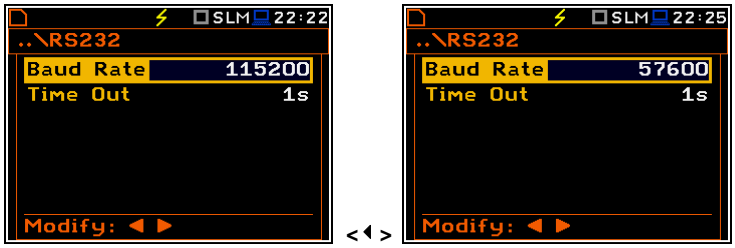


Instrument list, the RS232 window opening

Setting the transmission speed of the serial interface - **Baud Rate**

The RS 232 interface transmission (**Baud Rate**) speed can be selected from the following available values: **1200** (bits / second), **2400** (bits / s), **4800** (bits / s), **9600** (bits / s), **19200** (bits / s), **38000** (bits / s), **57600** (bits / s) or **115200** (bits / s). The selection is made by means of the **<◄ >**, **< ►>** push-buttons.

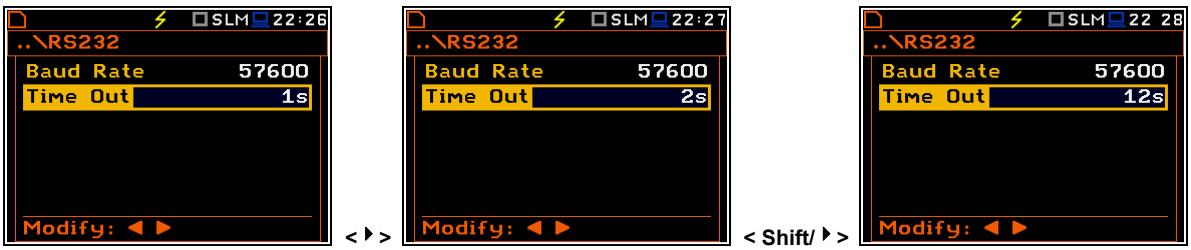
The other RS 232 transmission parameters are fixed to **8 bits for data**, **No parity** & **1 Stop bit**.



RS232 windows; the possible settings of the Baud Rate

Setting time limit for the performance of serial interface operation - **Time Out**

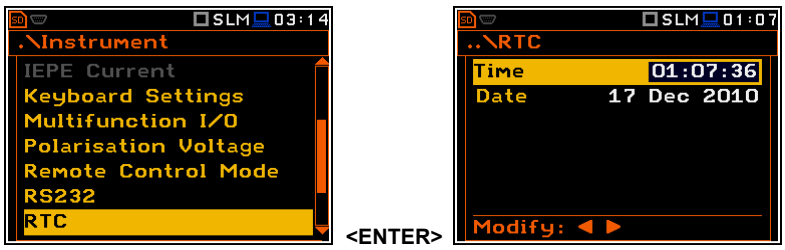
The default value of the parameter **Time Out** is equal to one but it can be too short period for the printers, which are not too fast. In such case, the **Time Out** parameter has to be increased.



RS232 window; the setting of the Time Out with 1 and 10-seconds step

8.13. Programming the instrument's internal Real Time Clock – RTC

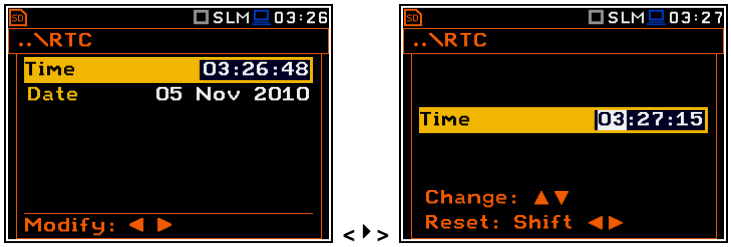
The **RTC** enables one to programme the internal **Real Time Clock**. This clock is displayed in the different places depending on the selected presentation mode.



Instrument list, the RTC window opening

The required hour, minute and second can be selected in a special window, which is opening by means of **< ◄ >**, **< ► >** push-buttons.

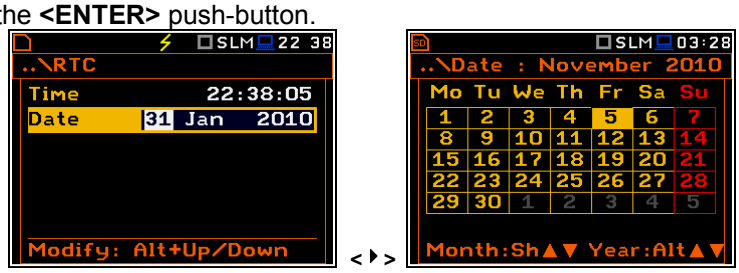
In order to set hours, minutes or seconds one has to enter its position pressing the **< ◄ >**, **< ► >** push button and then select the proper value by means of the **<▲>, <▼>** push-buttons and then to press the **<ENTER>** push-button.



RTC windows with the Time parameter setting

The required date can be selected in a special window, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons when the **Start Day** text is displayed inversely in the **Timer** sub-list.

In order to set data one has to select its position by means of the **< ◄ >** , **< ► >** and **<▲>, <▼>** push button and then press the **<ENTER>** push-button.



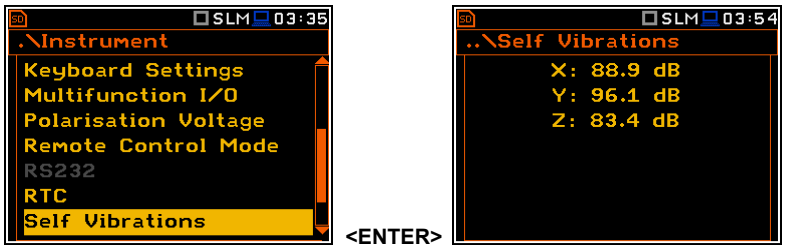
RTC windows with the Date parameter setting

> ***Notice:*** *The new value of a parameter is confirmed after each pressing of the* **<◄ >** *or* **< ►>** *push-buttons (new value is selected without any confirmation from the* ***<ENTER>*** *push-button).*

The window is closed and the instrument returns to the **Instrument** list after pressing the **<ENTER>** or **<ESC>** push-button.

8.14. Checking the instrument's vibration – Self Vibration

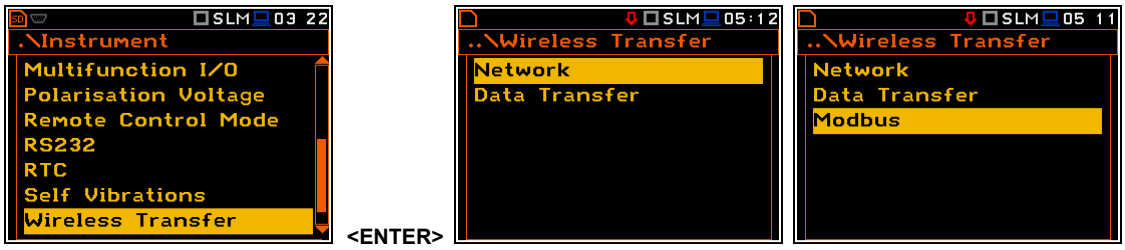
The **Self Vibration** enables the user to check the vibration of the instrument.



Instrument list; the Self Vibration window opening

8.15. Parameters of remote communication - Wireless Transfer

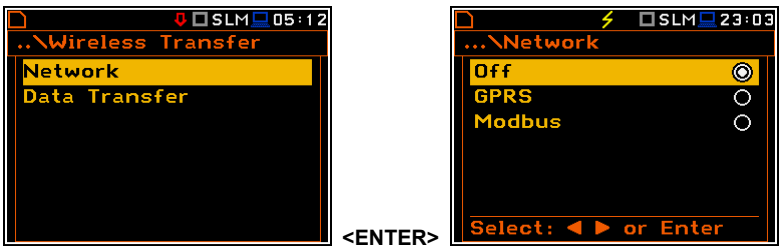
The **Wireless Transfer** enables the user to select the network, type and packet size of the packet communication.



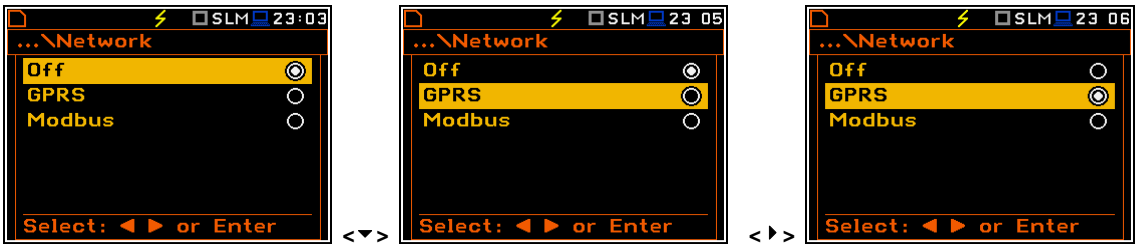
Instrument list, the Wireless Transfer window opening

8.15.1. Selection of the network type – Network

It is possible to select one of tree options: **Off**, **GPRS** and **Modbus**.



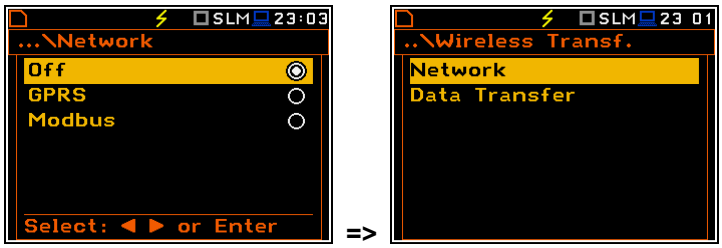
Wireless Transfer list, the Network window opening



Wireless Transfer windows; the Type selection

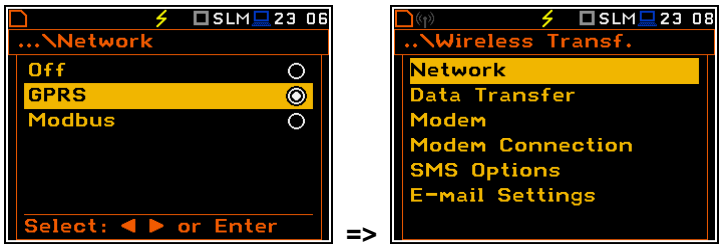
Depending on the settings in the Network list the **Wireless Transfer** screen has different set of positions.

If **Off** parameter was selected the **Network** window has two positions: **Network** and **Data Transfer**.



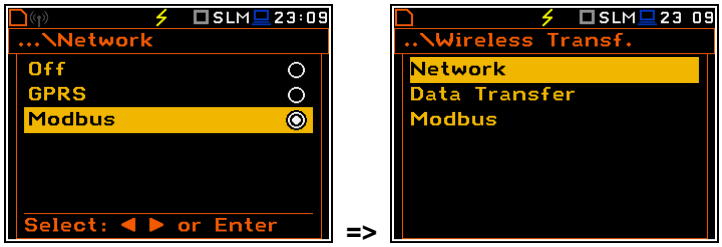
Wireless Transfer window when Off selected in the Network window

If **GPRS** parameter was selected the **Wireless Transfer** window has six positions: **Network**, **Data Transfer**, **Modem**, **Modem Connection**, **SMS Options** and **E-mail Settings**. Communication between modem and SVAN instruments is described in Appendix J.



Wireless Transfer window when GPRS selected in the Network window

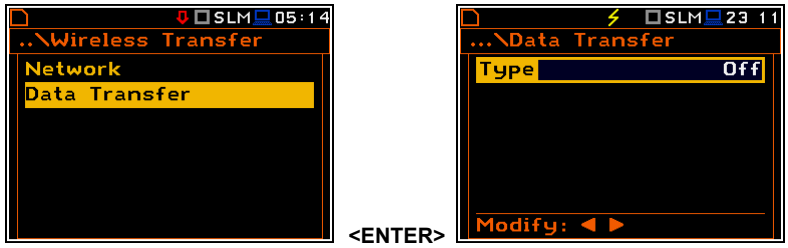
If **Modbus** parameter was selected the **Wireless Transfer** window has three positions: **Network**, **Data Transfer** and **Modbus**. Modbus protocol and its implementation in SVAN instruments is described in Appendix I.



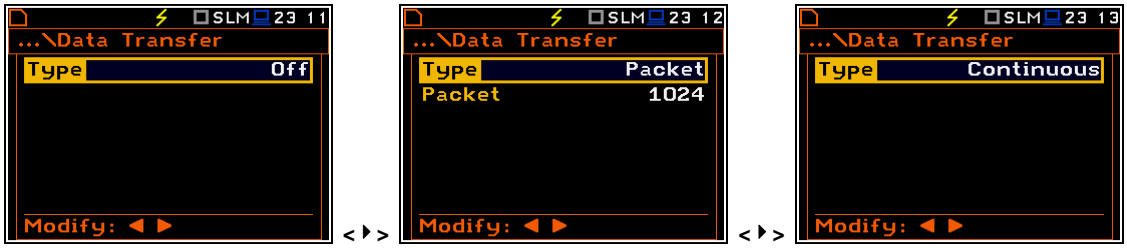
Wireless Transfer window when Modbus selected in the Network window

8.15.2. Selection of the data transfer type - Data Transfer

In this window the user can switch off or chose the data transfer type. The **Type** parameter enables the user to select the type of the **Wireless Transfer**. Three options are available: **Off**, **Continuous** and **Packet**.

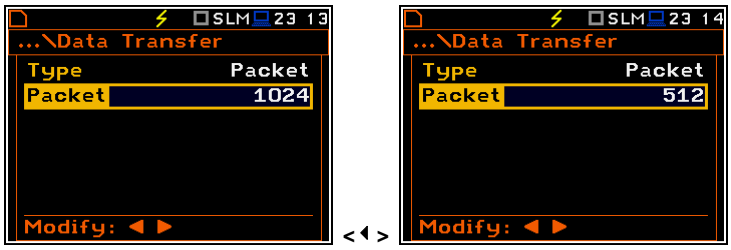


Wireless Transfer window; the Data Transfer selection



Data Transfer windows; the Type selection

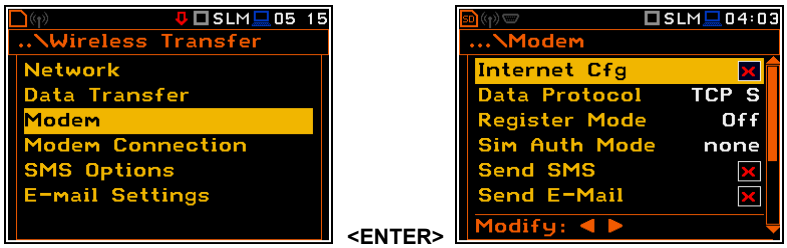
In the case of the **Packet** type it is possible to select the packet size in bits. The available options are **1024**, **512**, **256**, **128** and **64**.



Data Transfer windows; packet size selection

8.15.3. Configuration of modem basic settings – Modem

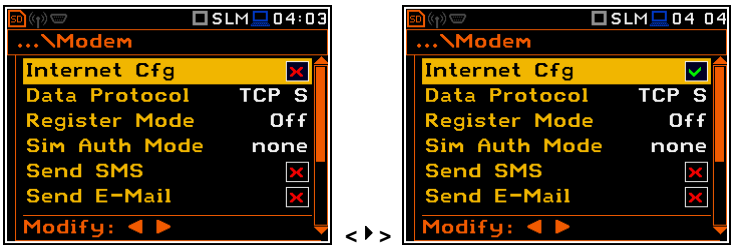
The **Modem** window enables one to configure modem basic settings, such as modem type and connection types.



Wireless Transfer window; Modem position selection

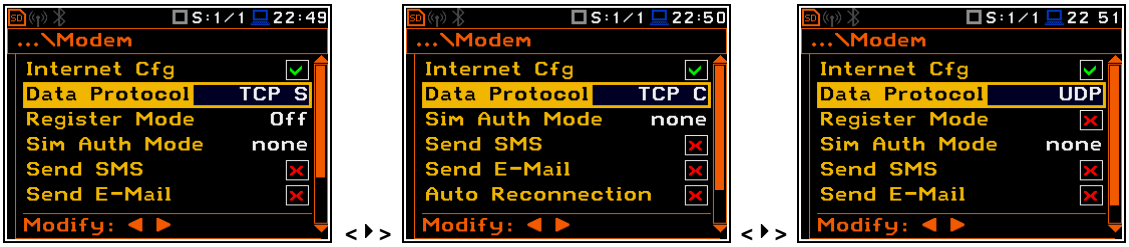
The **Modem** window contains the following options:

- **Internet Cfg** – ticking this option makes that the device is set to configure automatically the modem. When the device is turned off with this option set, it will attempt to configure the modem after next turn on. More about this option is written in Appendix J (Configuration and Registration).



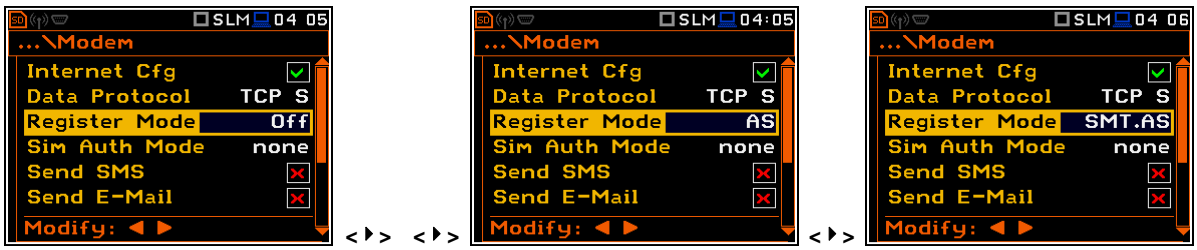
Modem windows; Internet Cfg option switching on

- **Data Protocol** – defines connection type for data exchange. Available types are **TCP S** (server mode), **TCP C** (client mode) and **UDP**.



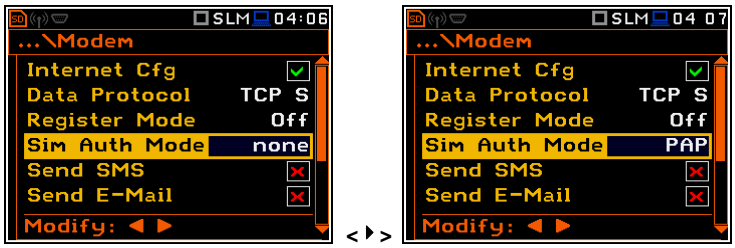
Modem windows; Data Protocol selection

- **Register Mode** – ticking this option makes that the device instantly attempts to register the station provided the modem is already configured. More about the registration is written in Appendix J (Configuration and Registration). Depending on selected **Data Protocol** type the values of this parameter are different. In case when **Data Protocol** type is **TCP S** the values of this parameter are: **Off**, **On** (registration using Connection Request Packets), **AS** (periodic registration on Svantek Server Address), **SMT.AS** (registration on Svantek Server Address – performed each time internet connection is initialized by the modem). In case when **Data Protocol** type is **TCP C** the **Register Mode** position is not appeared. In case when **Data Protocol** type is **UDP** the **Register Mode** is limited to **Off** and **On**.



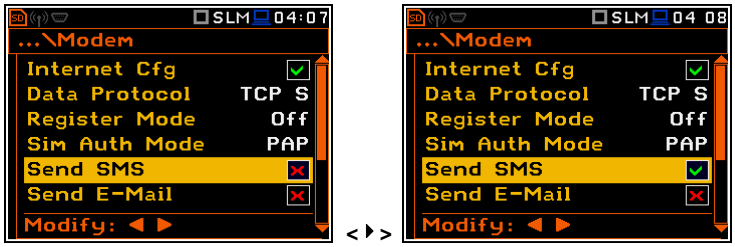
Modem windows; Register Mode selection

- **Sim Auth Mode** – defines the way of user verification by SIM card. Depending on the SIM card, several options are possible, some of them are recognized by the modem:
  - **none** – no verification required.
  - **PAP**
  - **CHAP**
  - **MsChap** – denotes MsChap in version 1.



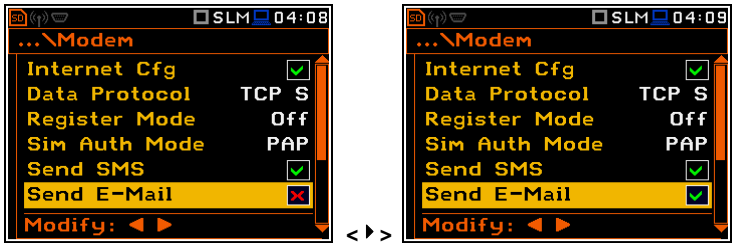
Modem windows; Data Protocol selection

- **Send SMS** – ticking this option will configure SMS service by the modem.



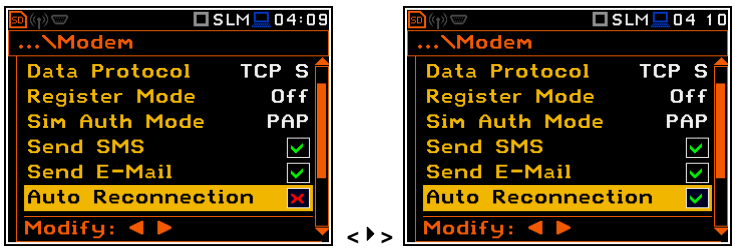
Modem windows; Send SMS switching on

- **Send E-Mail** – ticking this option will configure e-mail service by the modem.



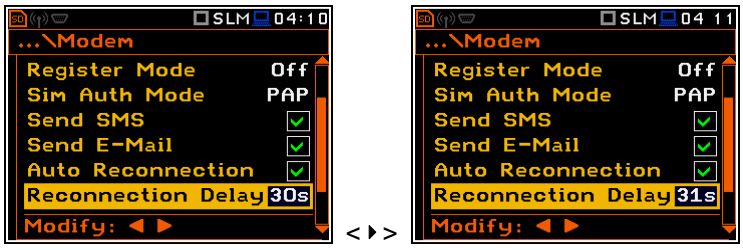
Modem windows; Auto Reconn. switching on

- **Auto Reconnection** – ticking this option will make the device attempt to reconnect the modem in the case of errors or sudden disconnection. More about this option is written in Appendix J (Error handling).



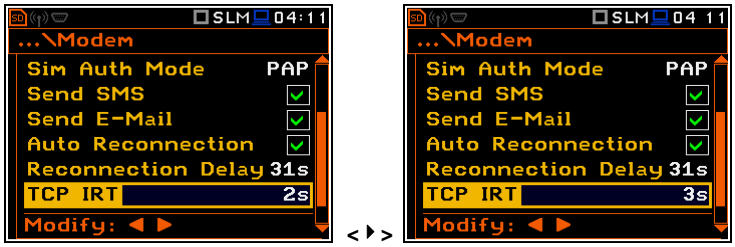
Modem windows; Auto Reconnection switching on

- **Reconnection Delay** – time between each reconnection attempt.



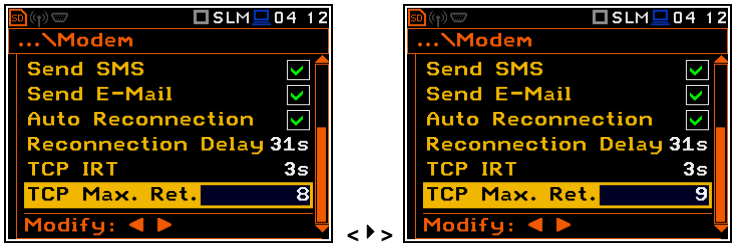
Modem windows; Reconnection Delay time selection

- **TCP IRT** - initial timeout for TCP connections. In some cases, extending this timeout may be helpful in case of slow connections, but default setting is recommended.



Modem windows; TCP IRT time selection

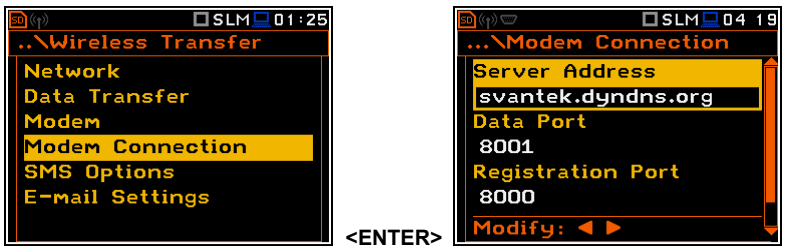
- **TCP Max. Ret.** - maximum reconnection attempts performed within a simple connection cycle. In some cases, setting higher value may be helpful in case of slow connections, but default setting is recommended.



Modem windows; TCP Max. Ret. selection

8.15.4. Setting of support modem options - Modem Connection

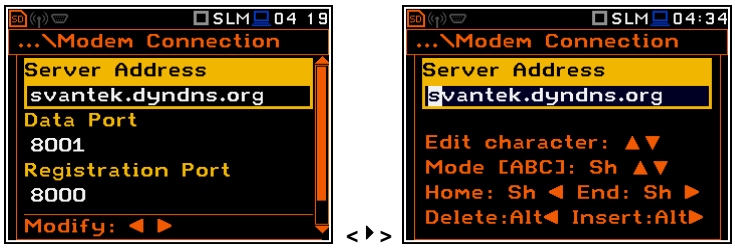
Modem Connection allows configuring several supporting options required to configure successfully SIEMENS modem to establish internet connection.



Wireless Transfer window; Modem Connection position selection

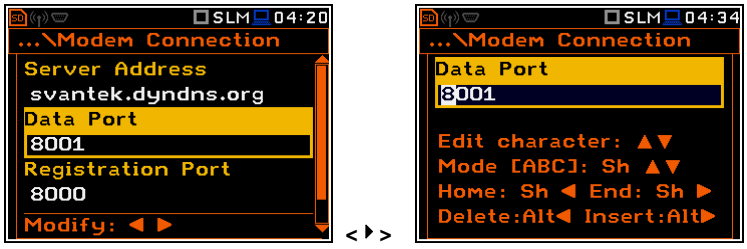
The **Modem Connection** window contains the following options:

- **Server Address** – allows one to enter up to 32 characters of either IP or domain address, where the registration data will be sent during the registration process (**Data Protocol: TCP S** or **UDP**) or to which the modem will connect to (**Data Protocol: TCP C)**. The edition is performing in the special window with text editor function, which is opening after pressing the **<◄>**, **<►>** push-buttons. More about this option is written in Appendix J (Configuration and Registration).



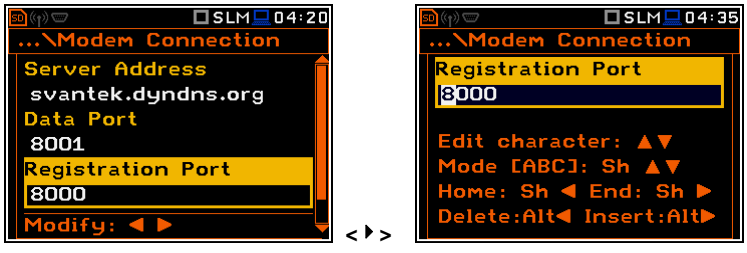
Modem Connection window; Server Address entering

- **Data Port** – allows entering up to 5 characters of port number. This number denotes a port on which a communication socket will be configured for data exchange between remote host and the station. The edition is performing in the special window with text editor function, which is opening after pressing the **<◄>**, **<►>** push-buttons.



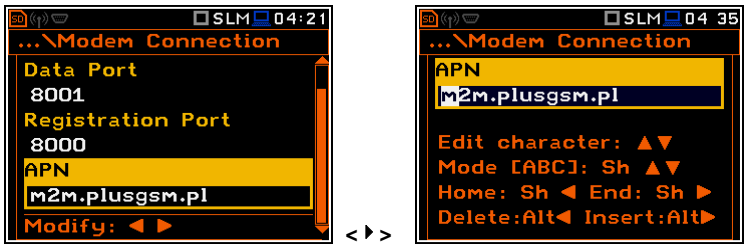
Modem Connection window; Data Port entering

- **Registration Port** – allows entering up to 5 characters of port number. This number denotes a port on which a communication socket will be configured to transmit registration packet (Register Mode: On) or exchange Http data (Register Mode: AS or SMT. AS). The edition is performing in the special window with text editor function, which is opening after pressing the **<◄>**, **<►>** push-buttons.



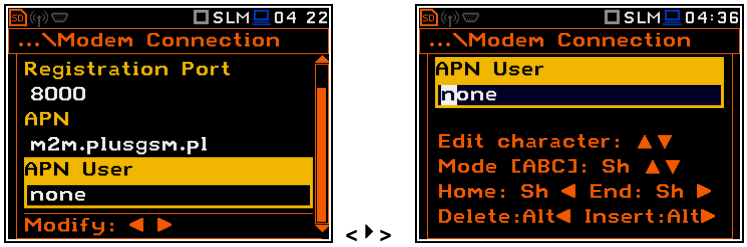
Modem Connection window; Registration Port entering

- **APN** – allows entering up to 20 characters of APN name of the SIM card used with the modem. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◀ >**, **< ▶ >** push-buttons.



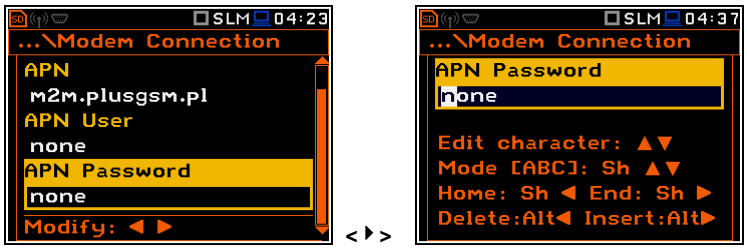
Modem Connection window; APN entering

- **APN User** – allows entering up to 20 characters of user name used for verification by the SIM card used with the modem. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◀ >**, **< ▶ >** push-buttons.



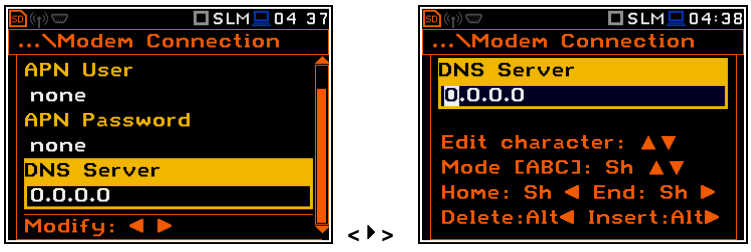
Modem Connection window; APN User name entering

- **APN Password** – allows entering up to 20 characters of password used for verification by the SIM card used with the modem. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◀ >**, **< ▶ >** push-buttons.



Modem Connection window; APN Password entering

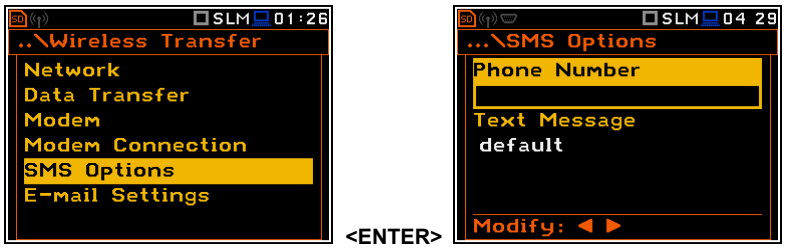
- **DNS Server** – allows one to enter up to 15 characters of IP address of DNS server used for establishing connection with the internet. In the most cases, leaving the default value of "0.0.0.0" will be sufficient, but some SIM cards may require a specific address to be entered. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◀ >**, **< ▶ >** push-buttons.



Modem Connection window; DNS Server address entering

8.15.5. Configuration of SMS service - SMS Option

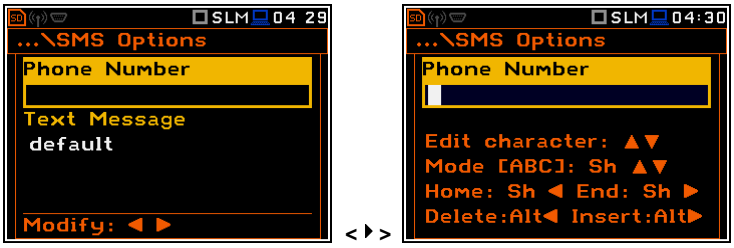
SMS Options – allows one to configure SMS service used for alarm notification. For more information about alarm notification see Appendix J (Alarm notification).



Wireless Transfer window; SMS Options position selection

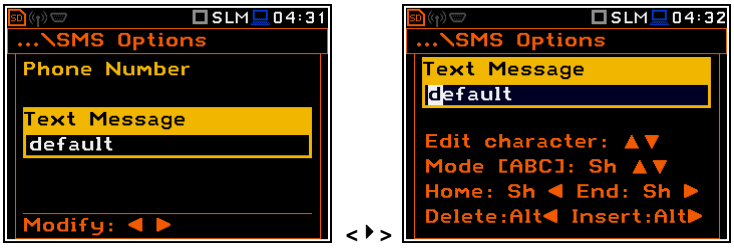
The **SMS Options** window contains the following options:

- **Phone Number** – allows one to enter up to 20 characters of phone number where the text messages will be sent. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



SMS Options window; Phone Number entering

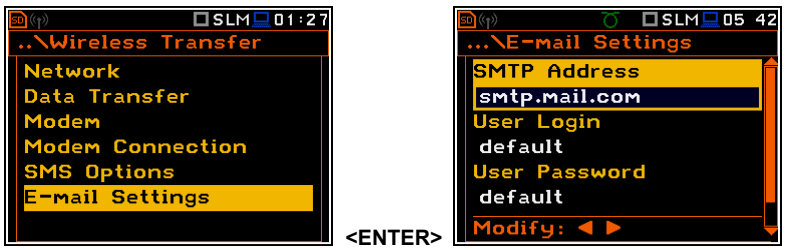
- **Text Message** – allows **one** to enter up to 20 characters of additional text, which will be appended into a standard alarm message template. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



SMS Options window; Text Message entering

8.15.6. Configuration of e-mail service - E-mail Settings

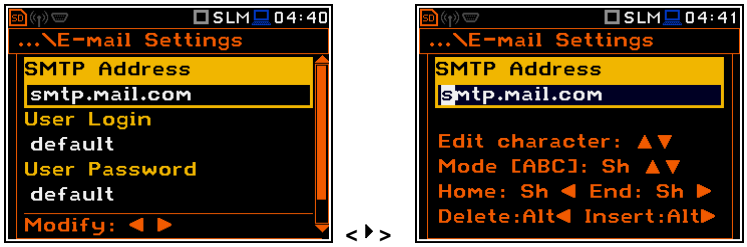
E-mail Settings tab – allows one to configure e-mail service used for alarm notification. For more information about alarm notification see Appendix J (Alarm notification).



Wireless Transfer window; E-mail Settings position selection

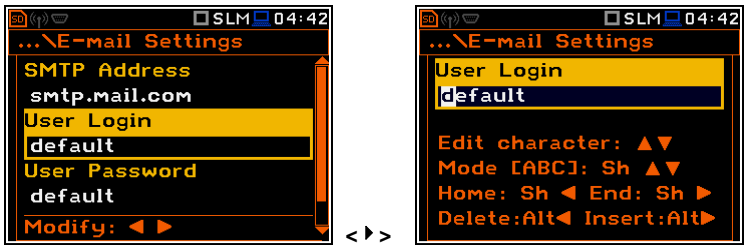
The **E-mail Settings** window contains the following options:

- **SMTP Address** – allows one to enter up to 32 characters of SMTP server address which will be used to send e-mail messages. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



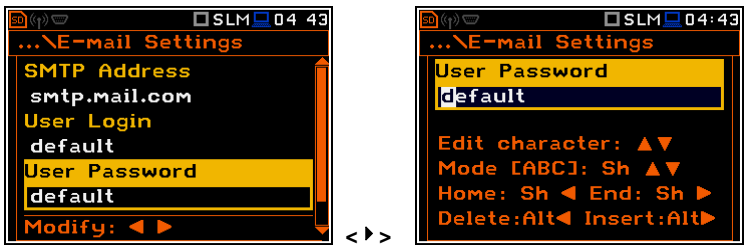
E-mail Settings window; SMTP Address entering

- **User Login** – allows one to enter up to 20 characters of user login used to establish verified connection with SMTP server. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



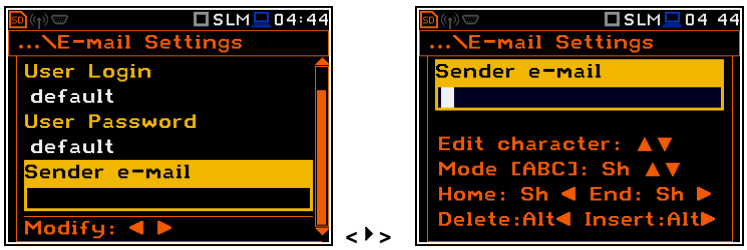
E-mail Settings window; User Login entering

- **User Password** – allows one to enter up to 20 characters of user password used to establish verified connection with SMPT server. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



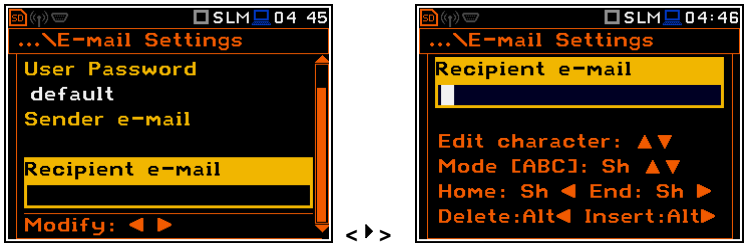
E-mail Settings window; User Password entering

- **Sender e-mail** – allows one to enter up to 48 characters of e-mail address from which the e-mail message will be sent. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



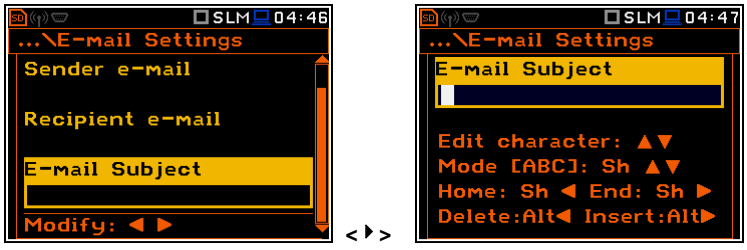
E-mail Settings window; Sender e-mail address entering

- **Recipient e-mail** – allows one to enter up to 48 characters of e-mail address to which the e-mail message will be sent. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



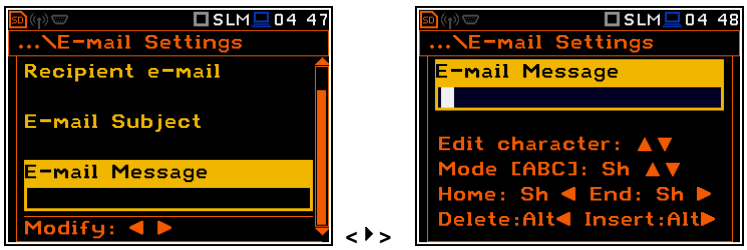
E-mail Settings window; Recipient e-mail address entering

- **E-mail Subject** – allows one to enter up to 20 characters of the message's subject. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



E-mail Settings window; E-mail Subject text entering

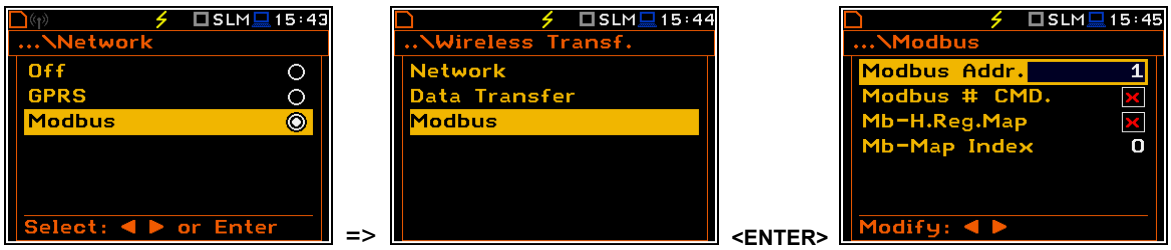
- **E-mail Message** – allows one to enter up to 20 characters of additional text which will be appended to standard e-mail message template used for alarm notification. The edition is performing in the special window with text editor function, which is opening after pressing the **< ◄ >**, **< ► >** push-buttons.



E-mail Settings window; E-mail Message text entering

8.15.7. Data transfer with the Modbus protocol – Modbus

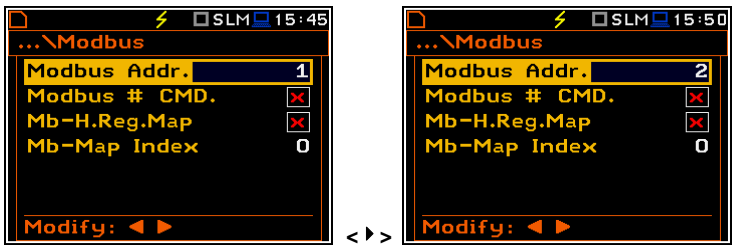
If **Modbus** parameter was selected the **Wireless Transfer** window has three positions: **Network**, **Data Transfer** and **Modbus**. Modbus protocol and its implementation in SVAN instruments is described in Appendix I.



Wireless Transfer window when Modbus option is chosen

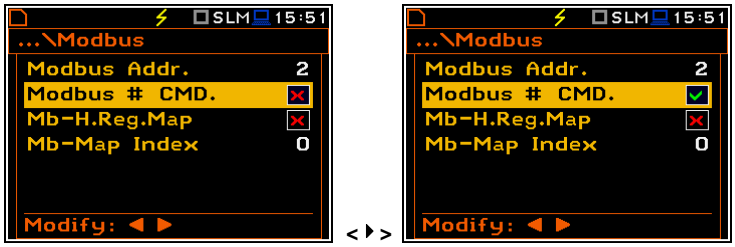
The **Modbus** window contains the following positions:

- **Modbus Addr.** - device's Modbus address, ranging from 1 to 247.



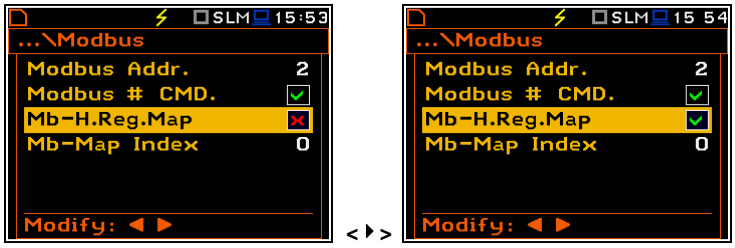
Modbus window; Modbus Addr. setting

- **Modbus # CMD.** - selecting this option, enables processing of Svantek # functions via Modbus protocol. Upon entering a # command into Modbus structures, it will be processed and any results will be placed in Input Registers (and Discrete Inputs) structure. **It is not recommended to use this option alongside with MB-H.Reg.Map option!**



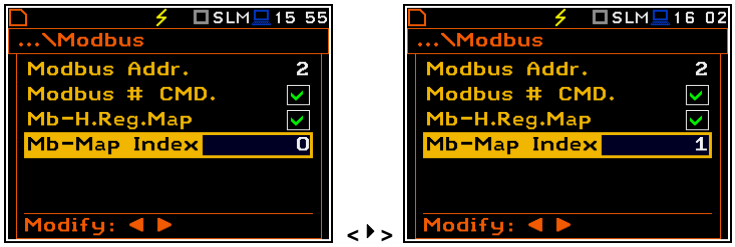
Modbus window; Modbus # CMD. option switching on

- **Mb-H.Reg.Map** - selecting this option enables result mapping. During measurement, ongoing results will be placed in Holding Registers starting from appointed address. **It is not recommended to use this option alongside with Modbus # CMD. option!**



Modbus window; Mb-H.Reg.Map option switching on

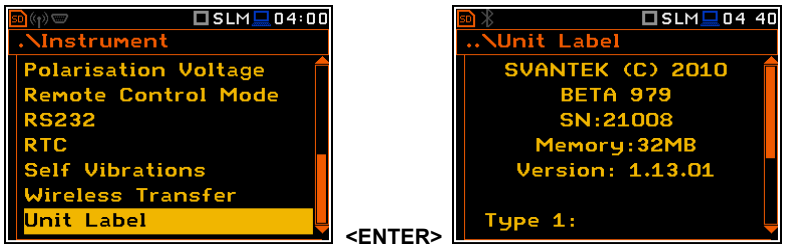
- **Mb-Map Index** - denotes address from which result map will be placed during measurements.



Modbus window; Mb-Map Index setting

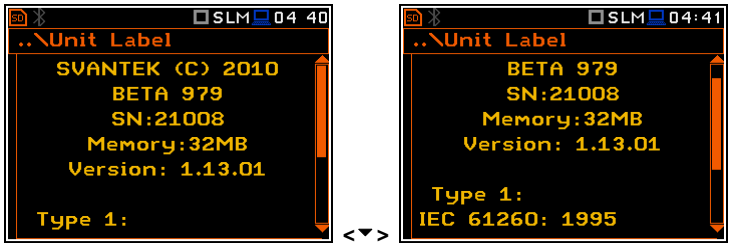
8.16. Checking specification of the instrument - Unit Label

The **Unit Label** enables the user to check the type of the instrument, its serial number, the current software versions installed in it and the standards, which the instrument fulfils.



Instrument list; the Unit Label window opening

After pressing the **<▲>**, **<▼>** push-buttons the displayed text is scrolled on the display and the user can check the number of the standard fulfilled by the instrument and the current revision of the software used in the PIC processor of the instrument.

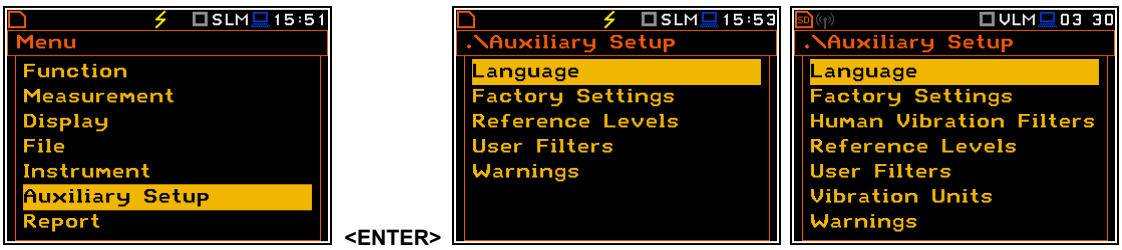


Unit Label windows; scrolling with the <▲>, <▼> push-buttons

***Notice**: The contents of the **Unit Label** should be always transmitted to the Svantek's service in the case of any problems faced by the user during the instrument's operation.*

9. AUXILIARY SETTINGS – Auxiliary Setup

The **Auxiliary Setup** list contains positions directly related with sound or vibration measurements and not related with the hardware components of the instrument. In order to open the **Auxiliary Setup** list the user has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**.



Display in the main list; the Auxiliary Setup window opening in Sound and Vibration modes

In the **Auxiliary Setup** list, the following items are available:

Language	it enables the user to set language of the user interface.
Factory Settings	it enables the user to return to the default, factory settings.
Reference Levels	it enables the user to select the reference level for the Vibration measurements and it informs the user about the reference level in the Sound measurements.
User Filters	it enables the user to select and set the correcting values for all real-time and 1/1 and 1/3 octave filters.
Vibration Units	it enables the user to select the Vibration units in which the results of the measurements are to be given. This position appears only in Vibration modes.
Warnings	it enables the user to switch on or off the warnings that can be displayed during the operation of the instrument.

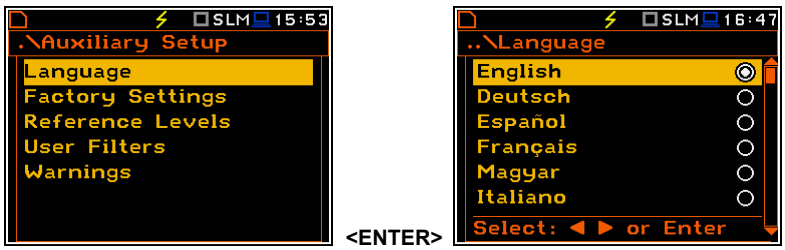
:

Pressing the **<Shift>** and **<▲>** push-buttons results in a movement to the first position of the opened list and pressing the **<Shift>** and **<▼>** – results in a movement to the last position of the opened list.

In each available position any change is performed by means of the **<◀>**, **<▶>** push-buttons. In order to confirm the selection the **<ENTER>** push-button has to be pressed. After this confirmation, the opened window or list is closed. In order to ignore any changes made in the opened window or list the user has to press the **<ESC>** push-button.

9.1. Setting the language of the user interface – Language

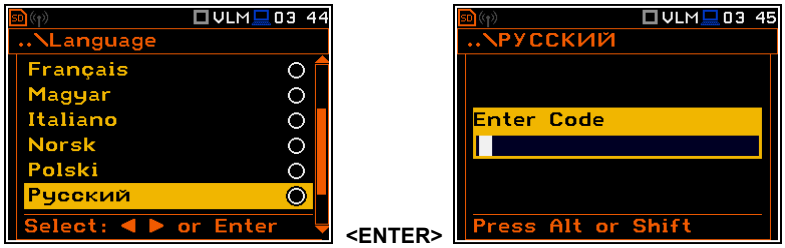
The **Language** enables one to select the language of the user interface. In order to enter the list one has to press the **<ENTER>** push-button on the inversely displayed **Language** text of the **Auxiliary Setup** list.



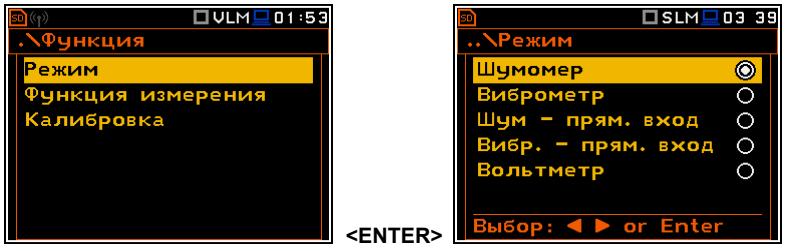
Auxiliary Setup list; the Language window opening

Language displays; change the user interface from English to German

For activation of the Russian version of the user interface, the special code has to be entered.



Displays during the entering of the access code to the Russian version of the user interface

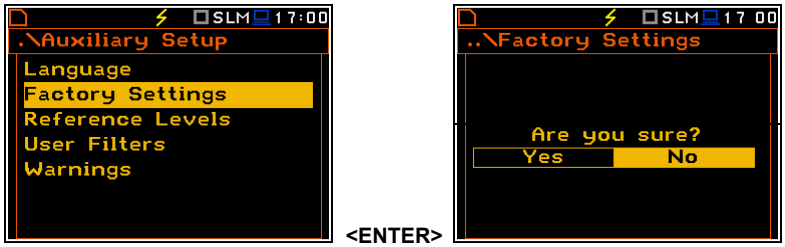


Displays with the Russian version of the user interface available only on some markets

In case when after power on the instrument the unknown language interface appears the user can reset the instrument by means of **<Shift/Enter>** and **<Alt/Start>** push-buttons pressed together. After this the instrument will go back to the default setup with the English interface.

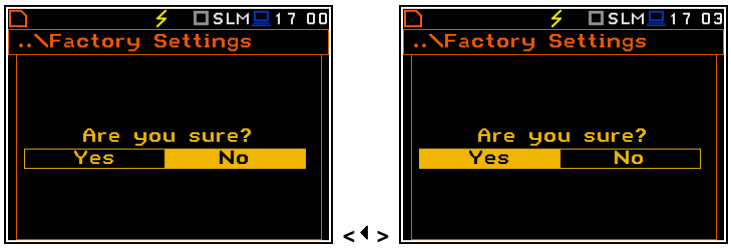
9.2. Return to the factory settings – Factory Settings

The **Factory Settings** enables the user to return to the default set up of the instrument.



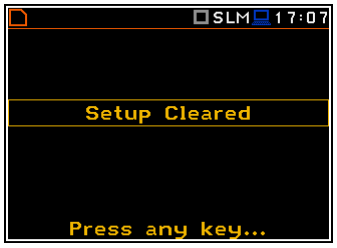
Auxiliary Setup list; the Factory Settings text highlighted

After entering this position, the request for the confirmation is displayed. The proper answer for the request is selected by means of the **< ◄ >**, **< ► >** push-buttons. The instrument returns to the default set up after pressing the **<ENTER>** push-button in the case when the answer **Yes** was chosen.



Displays with the request for the confirmation for the Factory Settings execution

During the clearing process the operation progress is displayed. The following message is displayed after the return to the default settings and the instrument waits for the user's reaction.



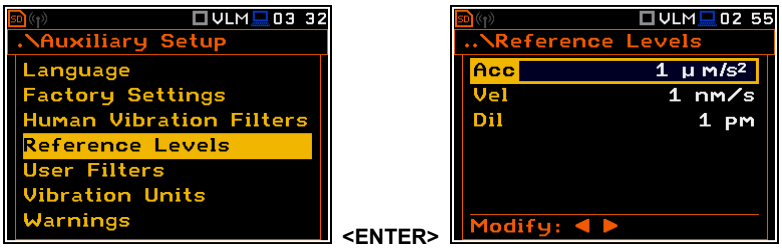
Displays during and after the execution of the Factory Settings function

The window is closed and the instrument returns to the **Setup** list after pressing any push-button with an exception of the **<Shift>** and the **<Alt>** one.

The factory setup can be install also by means of **<Shift/Enter>** and **<Alt/Start>** push-buttons pressed together.

9.3. Reference signal in vibration measurements - Reference Levels

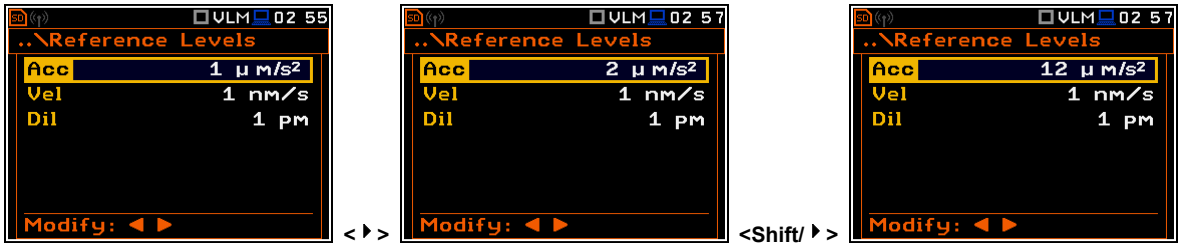
The **Reference Levels** sub-list enables the user to set the reference level of the vibration signal or to inform the user about the reference level in the case of sound measurements. The values, which are set here, are taken into account during the calculations of the measurement results expressed in the Logarithmic scale (with the dB as the units).



Auxiliary Setup list and the Reference Levels window

Setting the reference level of the acceleration signal – **Acc**

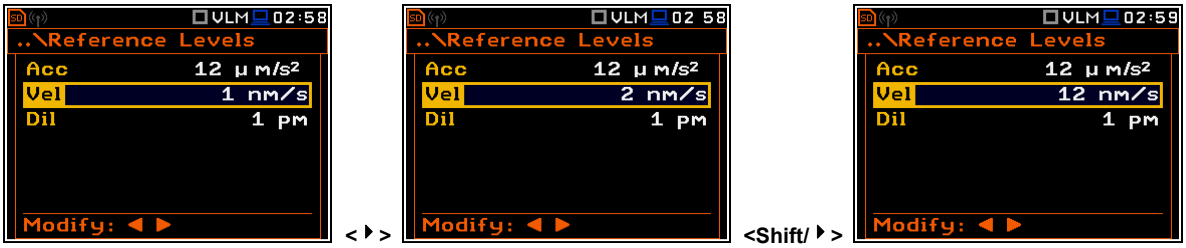
In the **Acc** position the user can set the reference level of the acceleration signal. It is possible to set this level from 1 μms^{-2} to 100 μms^{-2} with 1 μms^{-2} step pressing the **< ◀ >**, **< ▶ >** push-buttons. The step can be increased to 10 μms^{-2} pressing the **<Shift>** with the **< ◀ >**, **< ▶ >** push-buttons.



Reference Levels windows; the reference level setting of acceleration signal

Setting the reference level of the velocity signal – **Vel**

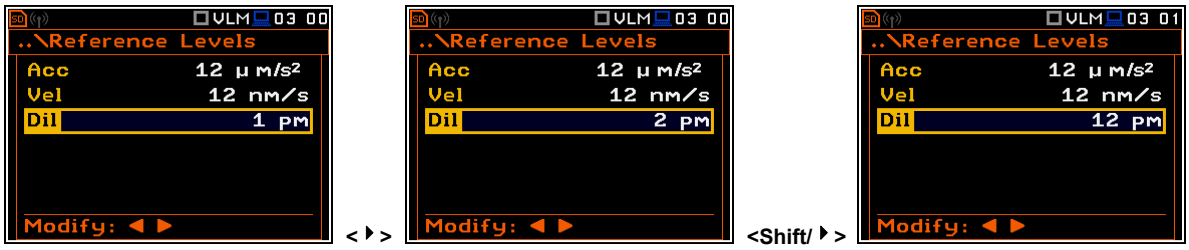
In the **Vel** position, the user can set the reference level of the velocity signal. It is possible to set this level from 1 nms^{-1} to 100 nms^{-1} with 1 nms^{-1} step pressing the **< ◀ >**, **< ▶ >** push-buttons. The step can be increased to 10 nms^{-1} pressing the **<Shift>** with the **< ◀ >**, **< ▶ >** push-buttons.



Reference Levels windows; setting the reference level of velocity signal

Setting the reference level of the displacement signal – **Dil**

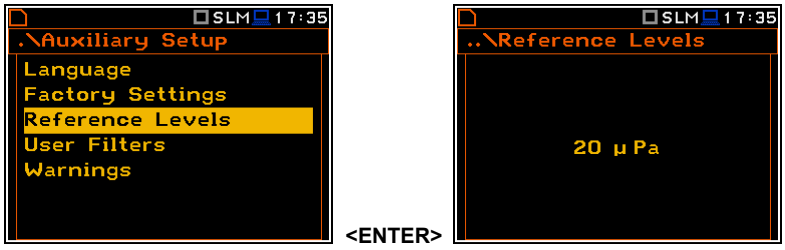
In the **Dil** position, the user can set the reference level of the displacement signal. It is possible to set this level from 1 pm to 100 pm with 1 pm step pressing the **< ◀ >**, **< ▶ >** push-buttons. The step can be increased to 10 pm pressing the **<Shift>** with the **< ◀ >**, **< ▶ >** push-buttons.



Reference Levels windows; setting the reference level of displacement signal

Reference level in sound measurements

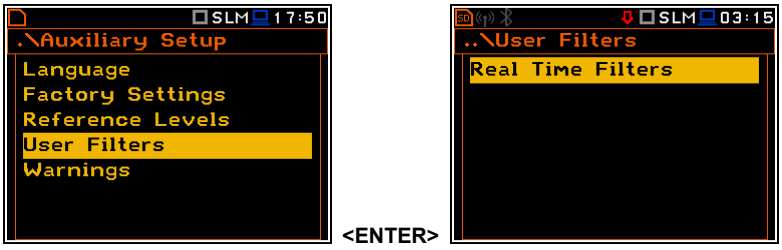
In the case of sound measurements the **Reference Levels** sub-lists is used only to inform the user that the reference level of the acoustic signal is equal to 20 µPa. After pressing the **<ESC>** or **<ENTER>** push-buttons the sub-list is closed.



Reference Levels windows; the reference level of the acoustic signal

9.4. Setting the coefficients of the user filters - User Filters

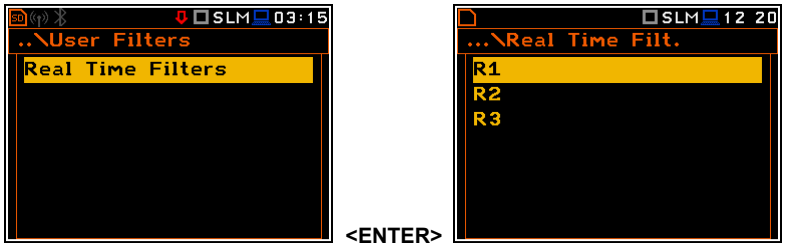
The **User Filters** position enables the user to introduce the values of the coefficients of the user filters.



Auxiliary Setup list, the User Filters window opening

9.4.1 Introduction the parameters of real time filters - Real Time Filters

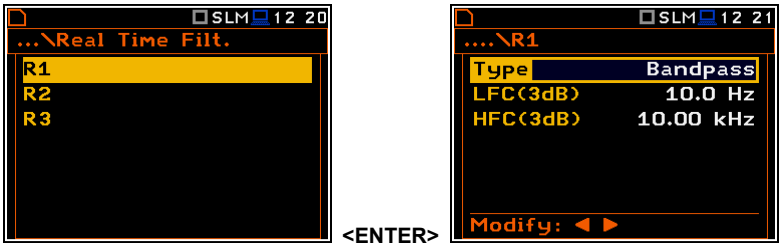
The **Real Time Filters** sub-list enables the user to introduce the values of the correcting coefficients taken into account in the **real time measurements**. The **Real Time Filters** (sub-list) contains 3 positions: **R1**, **R2**, **R3**.



User Filters windows, Real Time Filters selected

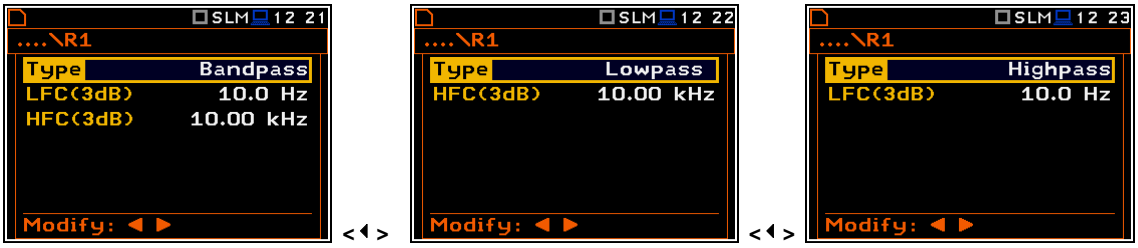
9.5.1.1. Selecting real time filter – Rx

In **Rx** (**R1**, **R2**, **R3**) window there are three positions: **Type**, **LFC(3dB)**, **HFC(3dB)**.



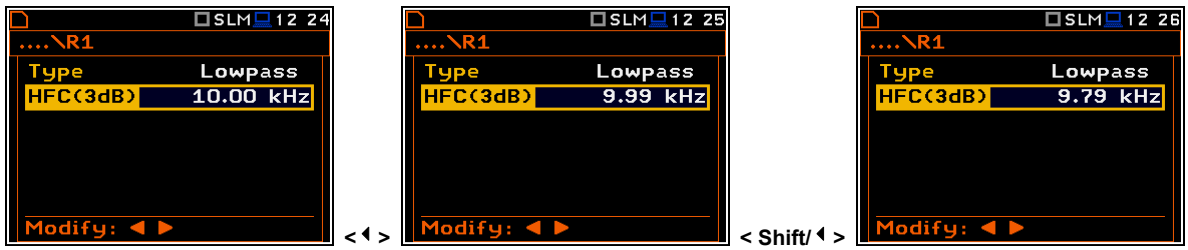
Real Time Filters windows, the filter selection

In the **Type** position there are three options: **Highpass**, **Bandpass** and **Lowpass** denoting the type of the digital filter, which has to be designed and implemented. All mentioned above filters, high-pass, band-pass and low-pass, are the second order, which means that the slope is equal to 12 dB/octave.



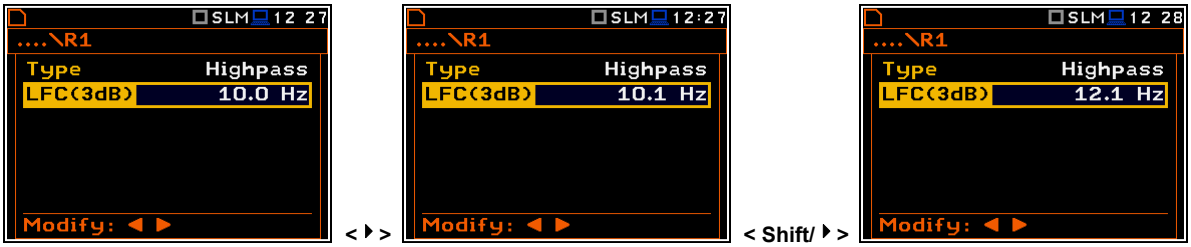
R1 filter windows, the Type selection

In the case of a low-pass filter the user has to determine the **HFC(3dB)** parameter which denotes the **HFC** (**H**igh **F**requency **C**orner) of the **Rx** filter at which the amplitude of the input signal is attenuated two times. The available values are from 100 Hz to 10.0 kHz.



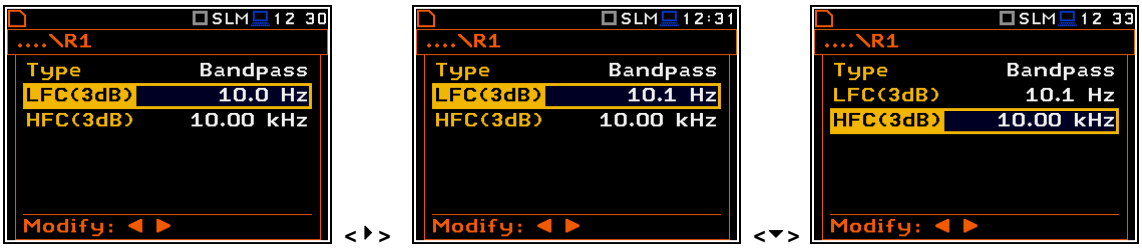
R1 filter windows, the HFC(3dB) selection for a Lowpass filter

In the case of a high-pass filter the user has to determine the **LFC(3dB)** parameter, which denotes the **LFC** (**L**ow **F**requency **C**orner) of the **Rx** filter at which the amplitude of the input signal is attenuated two times. The available values of the **LFC** are from 10 Hz to 10.0 kHz.



R1 filter windows, the LFC(3dB) selection for a Highpass filter

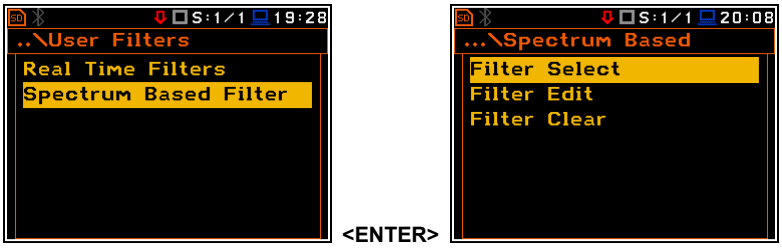
In the case of a band-pass filter, the user has to determine two frequencies: the **LFC(3dB)** which denotes the (**L**ow **F**requency **C**orner) and the **HFC(3dB)** of the **Rx** filter. At these frequencies, the amplitude of the input signal is attenuated two times. The available values of the **LFC** are from 10 Hz to 10.0 kHz, while the **HFC** the available values are from 100 Hz to 10.00 kHz.



R1 filter windows, the LFC(3dB) selection and the HFC(3dB) selection for Bandpass filter

9.4.2 Setting filter coefficients for octave analysis - Spectrum Based Filter

The **Spectrum Based Filter** sub-list enables the user to introduce the values of the filter coefficients correcting the results of **1/1 Octave** or **1/3 Octave** analysis. The results of the analysis (the Total values) can be modified by the introduced factors.



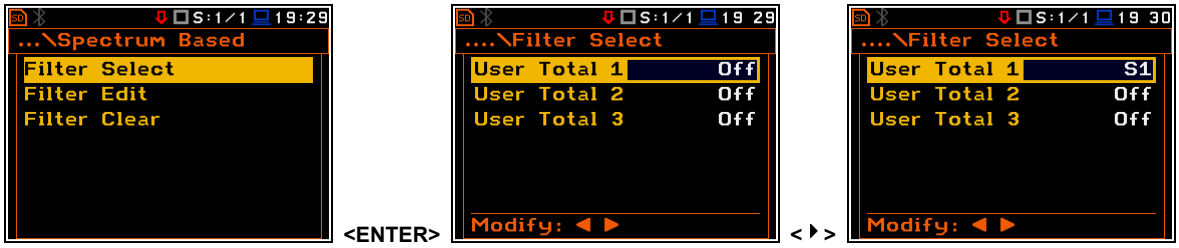
User Filters window, Spectrum Based Filter window opening

9.5.2.1. Selection the user filter for total value calculation – Filter Select

The **Filter Select** sub-list enables one to select the filter **S1**, **S2** or **S3**, used for calculation of the Total values. The filter selection is different for Sound and Vibration modes.

Sound modes

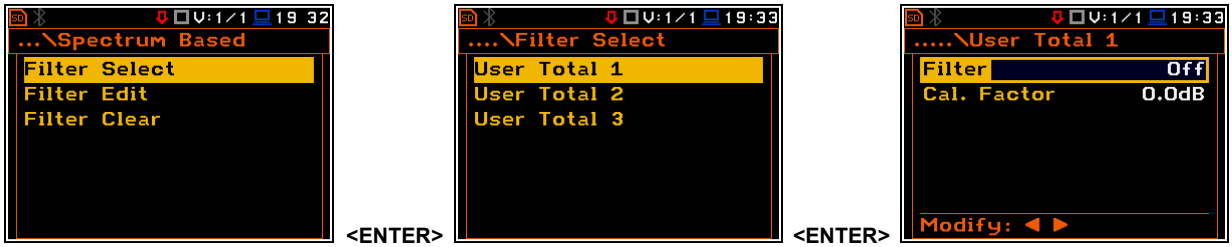
In the **Filter Select** window one can select one of three mentioned above filters (**S1**, **S2** and **S3**) for **1**, **2** or **3 User Total** values calculations. The selection of the filter in this sub-list is performed by means of the **< ◀ >**, **< ▶ >** push-buttons.



Spectrum Based Filter window, the Filter Select window opening in Sound modes

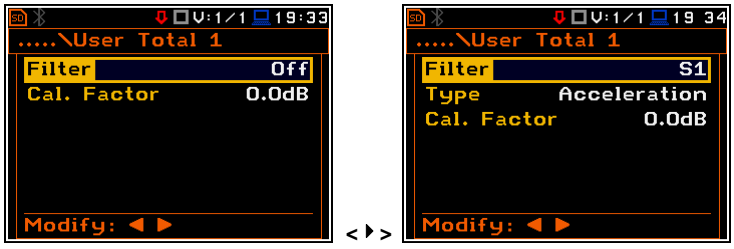
Vibration modes

In the **Filter Select** window one can open three **User Total** window.

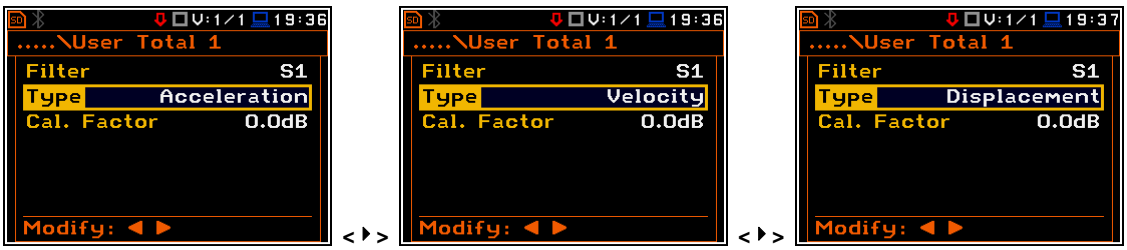


Spectrum Based Filter window; User Total window opening in Vibration modes

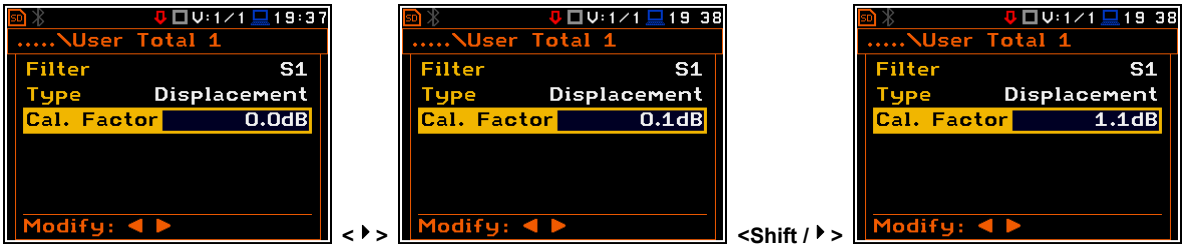
In the **User Total** window one can select one of three filters: **S1**, **S2** and **S3**, set the calibration factor and type of integration filter for measuring **Acceleration**, **Velocity** and **Displacement**.



User Total window in Vibration modes; Filter selection



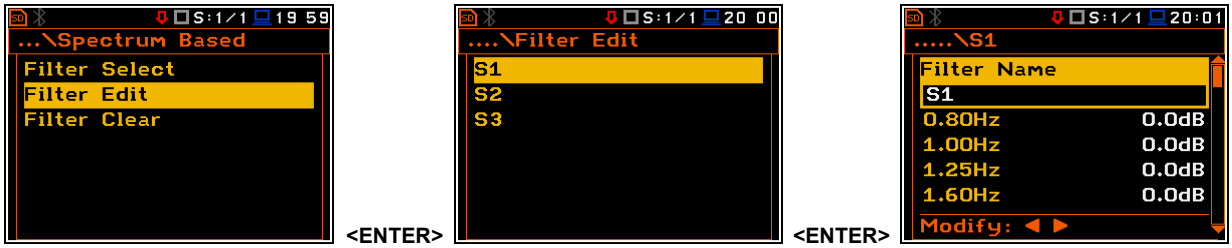
User Total window in Vibration modes; Type selection



User Total window in Vibration modes; Cal. Factor selection

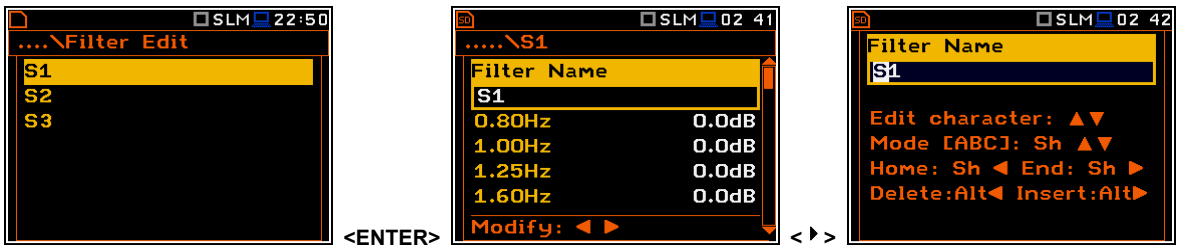
9.5.2.2. Setting the coefficients of the user filters set – Filter Edit

The **Filter Edit** sub-list enables the user to select which filters should be edited; the available options are as follows: **S1**, **S2**, **S3** or any other transmitted to the instrument from a PC by means of the interface.



Spectrum Based Filter window, the Filter Edit window opening

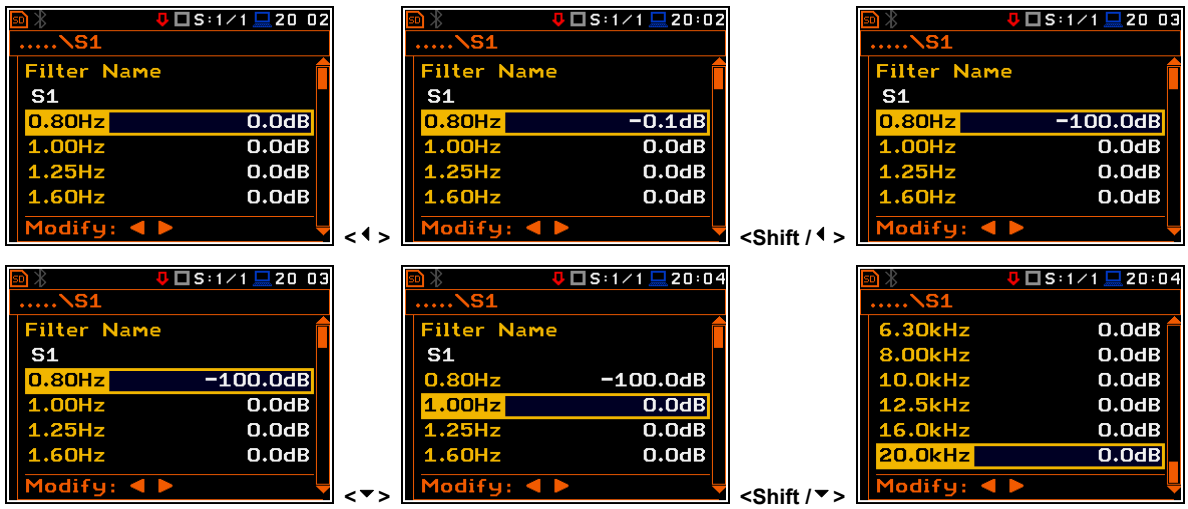
The filter name can be changed in the edition window, which is opening by means of the **< ◂ >**, **< ▸ >** push-buttons.



Filter Edit window, the filter selection

The opened window contains the centre frequencies of the filters and their coefficients:

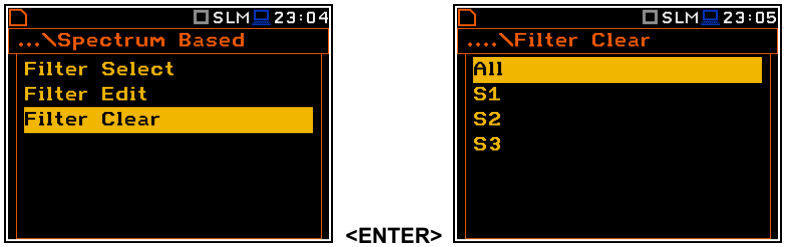
- **0.80 Hz:** available values for 0.8 Hz centre frequency filter: **-100.0dB ... 100.0dB**
- **1.00 Hz:** available values for 1Hz centre frequency filter: **-100.0dB ... 100.0dB**
- **...**
- **20.0kHz:** available values for 20 kHz centre frequency filter: **-100.0dB ... 100.0dB**



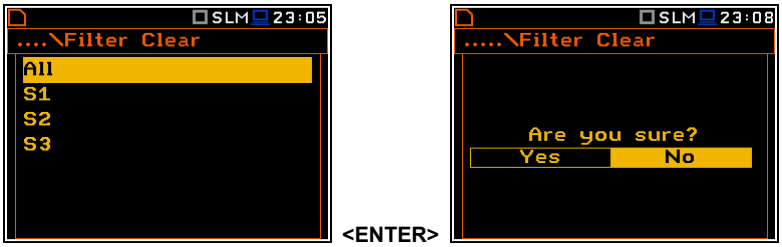
S1 filter windows; the coefficients selection

9.5.2.3. Clearing the coefficients of the user filters – Filter Clear

The **Filter Clear** position enables the user to clear the values of the user coefficients of octave or third octave filters. It is possible to clear all sets of coefficients (**All**), to clear the first set (**S1**), to clear the second set (**S2**), to clear the third one (**S3**) or any other transmitted to the instrument from a PC by means of the interface.



Spectrum Based Filter window; the Filter Clear window opening

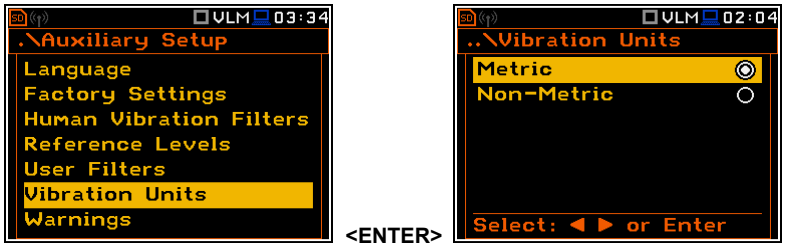


Filter Clear windows, the selection of all filters to be cleared

After this, the **WAIT** text appears on the display and the instrument returns to the **Filter Clear** window.

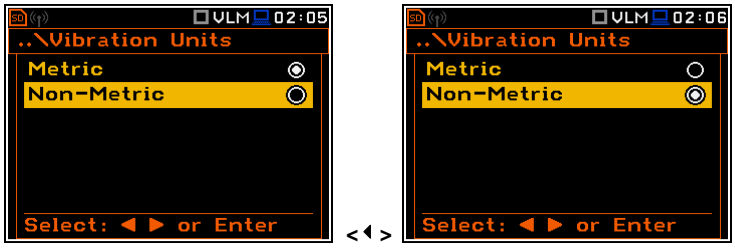
9.5. Selection of the Vibration units - Vibration Units

The **Vibration Units** position enables the user to select the units for the Vibration measurements (this position is available only in Vibration modes).



Auxiliary Setup list, the Vibration Units window opening

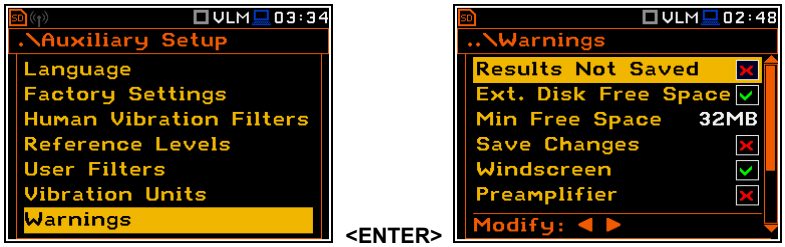
It is possible to select the **Non-Metric** units (e.g. g, ips, mil etc.) or **Metric** units (e.g. m/s^2, m/s, m etc.).



Vibration Units windows; Non-metric units selection

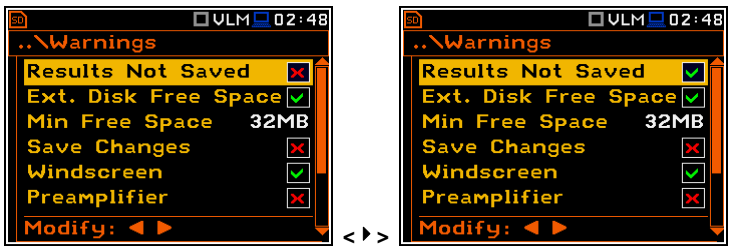
9.6. Warnings selection – Warnings

The **Warnings** enables the user to select the messages, which could be displayed during the operation of the instrument.



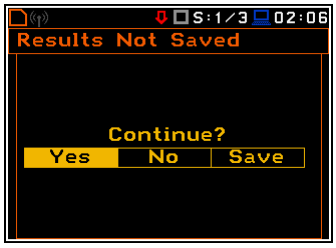
Auxiliary Setup list, the Warnings window opening

Saving the measurement results in a file - **Results Not Saved**



Warnings windows; Results Not Saved warning selection

When the position is set to be active the special warning can be displayed after pressing the **<Start/Stop>** push-button. It will be happened in a case when the result of the previous measurement was not saved in a file of the instrument.

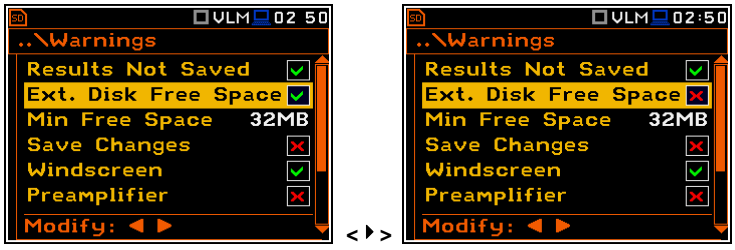


Displays with Last Results Not Saved warning

The question **Continue?** appears with the warning message. There are three options: **Yes**, **No** or **Save**. If **Yes** is chosen, the instrument returns to the active mode of result presentation starting the new measurement process. If **No** is chosen, the instrument returns to the active mode of measurement result's presentation without starting the new measurement process. If **Save** option is chosen, then the measurement results are saved.

Checking free space on the external disk – **Ext. Disk Free Space**

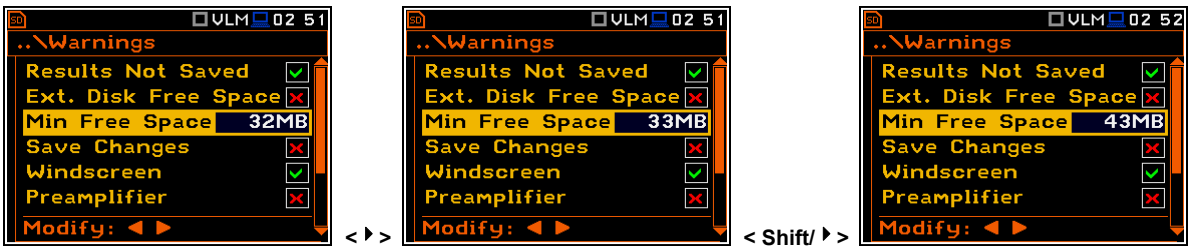
This position swiths on/off the checking of free space on the external memory and generates the warning when the space is lower than Min Free Space.



Warnings windows; Ext. Disk Free Space warning deselection

Minimum memory free space setting - **Min Free Space**

In this line, the user can determine the amount of the **SD card** or **USB disk** memory free space.

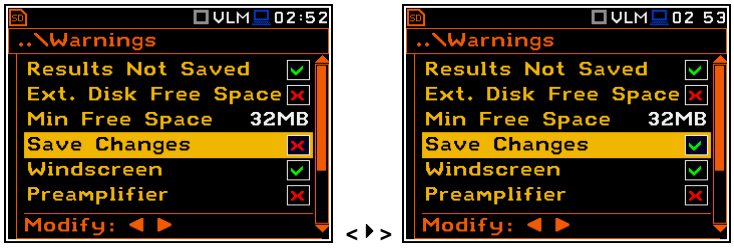


Warnings windows; Min Free Space warning selection

The selected limit has to be within the range [1 MB, 1024 MB]. If the available memory is not greater than that limit, the warning will be displayed.

Confirmation of parameter changes - **Save Changes**

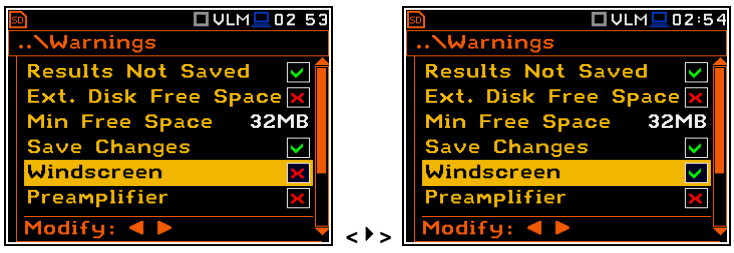
In this line the user can switch on the option of confirmation of parameters changes, after exit the screen with the parameter list by means of the **<ESC>** push-button.



Warnings windows; Save Changes warning selection

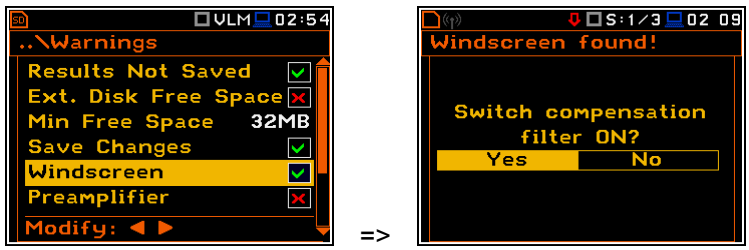
Windscreen detection – **Windscreen**

If this parameter is switch on the instrument will ask to swith on/off the compensation filter every time the windscreen is removed or put on again. The windscreen is detected automatically if parameter **Windscreen** is set on **Auto** (*path: <Menu> / Measurement / Compensation Filter*).



Warnings windows; Windscreen warning selection

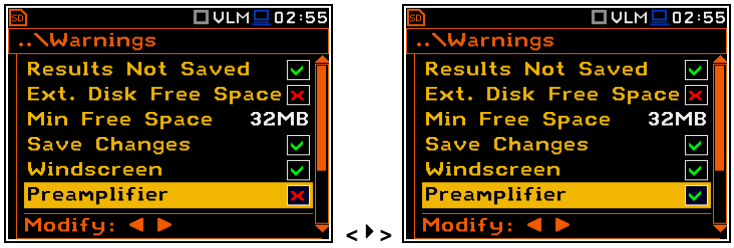
When **Windscreen** parameter is switched on and the instrument detects the windscreen the next message appears. The user shall choose **Yes** or **No** option and press the **<Enter>** push-button.



Warning and prompt to switch the windscreen compensation filter on

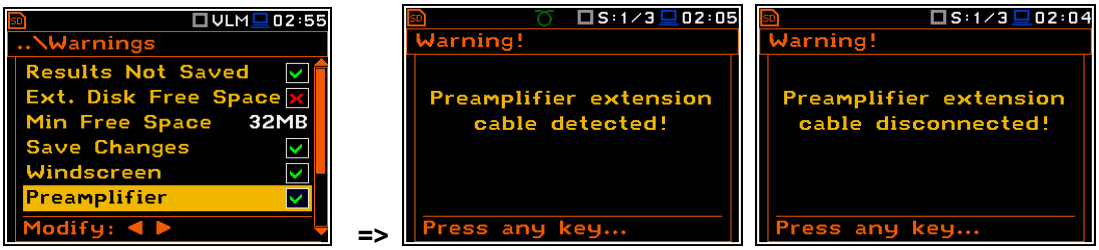
Preamplifier detection – **Preamplifier**

If this parameter is switch on then the instrument will send the message in case the preamplifier is connected to the instrument through the extension cable.



Warnings windows; Preamplifier extension cable warning selection

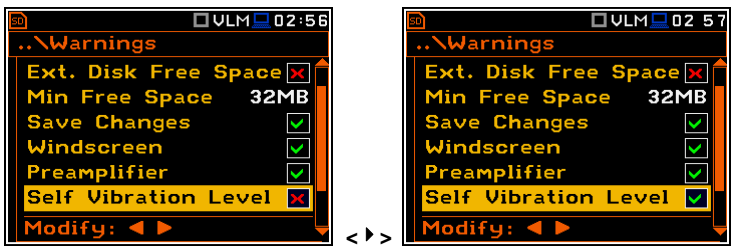
When **Preamplifier** parameter is switched on and the instrument detects the extension preamplifier cable, then the below messages appears.



Warnings that the extension cable is detected or disconnected

Self-vibration warning - **Self Vibration Level**

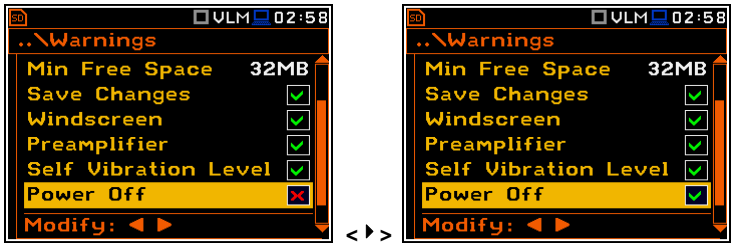
If this parameter is switch on then the instrument will send the message in case when self vibration level is high and can lead to the accuracy lost.



Warnings windows; Self Vibration Level warning selection

Confirmation of the instrument switch off– **Power Off**

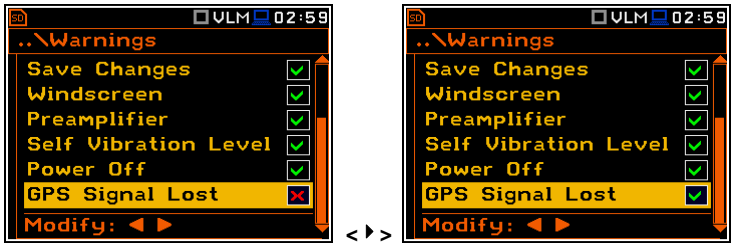
If this parameter is switch on then the instrument will send the message in case when the user is switching it off.



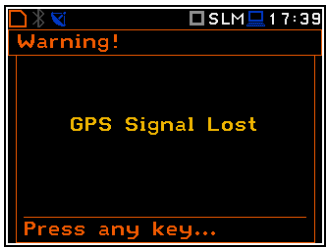
Warnings windows; Power Off warning selection

GPS signal lost warning – **GPS Signal Lost**

If this parameter is switch on then the instrument will send the message in case when the GPS signal was lost.



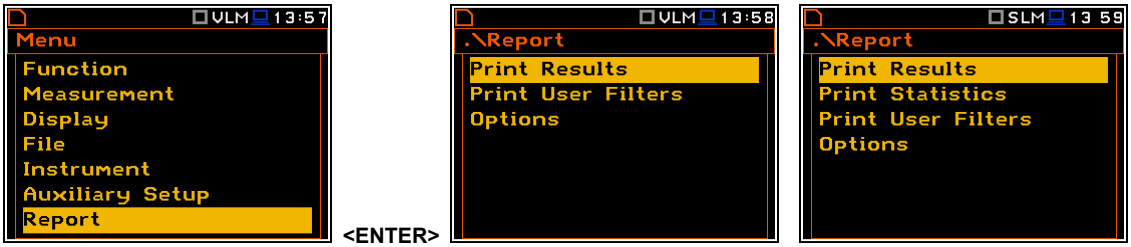
Warnings windows; GPS Signal Lost warning selection



GPS Signal Lost warning

10. REPORTS PRINTING – Report

The printed reports of the sound or Vibration mesurement results in the predefined format can be obtained by means of the **Report** list. In order to open the **Report** list the user has to press the **<Menu>** push-button, select the **Function** text and press **<ENTER>**.



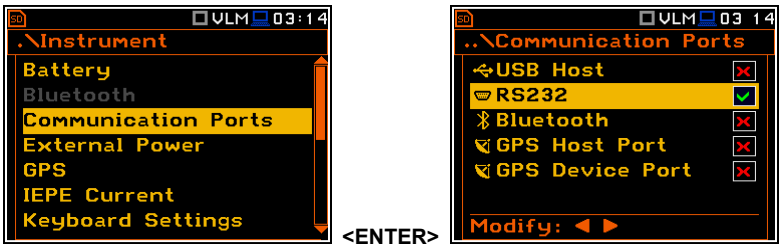
Display in the main list; the Report window opening in Vibration and Sound modes

In order to obtain the report the user has to connect the instrument to the printer's RS 232 port using the **SV 55** RS 232 interface. This hardware interface is hidden in the Cannon type, 9-pin RS 232 plug-in. On the other end of the **SV 55** interface, which itself looks like a cable, there is the USB Host plug-in. This plug-in should be placed in the USB Host socket of the instrument.

It is also possible to connect the instrument to the USB port of a PC using the proper cable. Measurement results can be easy downloaded to any PC (using USB interface and SvanPC software) and printed out on the printer attached to a PC.

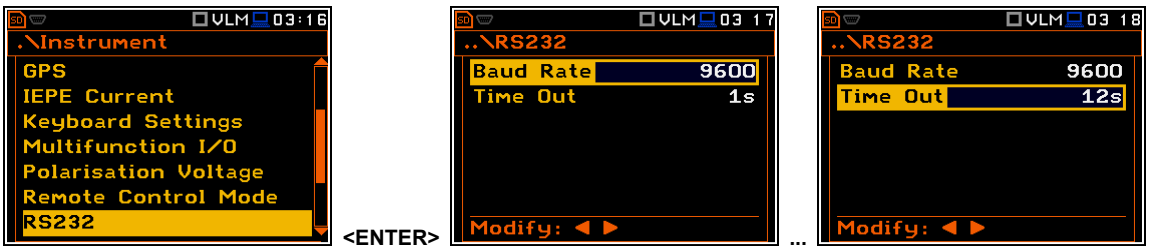
Notice: *The converter **SV 55** serves as the RS 232 interface. The **SV 55** connection to the **USB Host** socket is detected and after successful detection the headphone icon is switched on. The transmission using the **SV 55** is possible only in the case when the instrument is not connected to a PC with the **USB Device** port.*

The **RS232** is the default setting in the **Communication Ports** in the **Instrument** list. Only in this option the USB host controller is awaken and the power consumption is the lower one.



Setup list with the USB–Host Port selected and this window with the activated RS232

The user has to be sure that the **RS232** is activated (*path: <Menu> / Instrument / Communication Ports*) before starting printing reports. Additionally, in the **RS232** list (*path: <Menu> / Instrument / RS232*) the user has to select the proper speed of the transmission and the parameter called **Time Out**.



Setup list with the RS232 selected and the exemplary contents of this window

The RS 232 interface transmission (**Baud Rate**) speed can be selected from the following available values: **1200** (bits / second), **2400** (bits / s), **4800** (bits / s), **9600** (bits / s), **19200** (bits / s), **38000** (bits / s), **57600** (bits / s) or **115200** (bits / s).

The selection is made by means of the **<◀>**, **<▶>** push-buttons. The transmission speed should correspond to the one selected in a printer. The other RS 232 transmission parameters are fixed to **8 bits for data**, **No parity** & **1 Stop bit**. The default value of the **Time Out** parameter is equal to one but it can be too short period for the printers, which are not too fast. In such case, this parameter has to be increased.

The description of the **SV 55** pin-outs is given in App. C. The printers with the different connections on the RS 232 socket require the special, individual RS 232 – RS 232 cable that should fulfil the suitable wire crossing.

The printers, in which the Centronics interface is available instead of the RS 232 one, can be connected to the instrument by means of the **SV 52** RS 232 – Centronics interface.

The printers, which have only USB interface, are currently not driven by the instrument.

***Notice**: Switch the power off before connecting the instrument to any external device (e.g. a printer or a Personal Computer).*

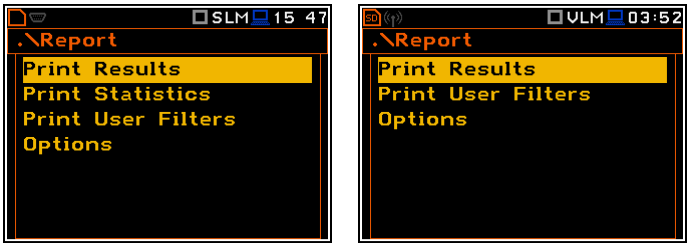
The **Report** list contains the following elements:

Print Results	that enables the user to print out the measurement results on the default printer or to send the measurement results to a PC using SvanPC software and USB interface;
Print Statistics	that enables the user to print out the statistics of the measurement results; this position is not available in the case of Vibration measurements;
Print User Filters	that enables the user to print out on a printer connected directly to the instrument the values of the user filters introduced in the instrument or to send them to a PC using SvanPC software and USB interface;
Options	that enables the user to determine the options of the report.

***Notice**: All reports are printed in the character format using the ASCII set.*

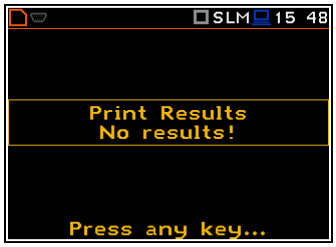
10.1. Printing of the measurement results - Print Results

The **Print Results** enables the user to print the report on the attached printer or to send out the report to a PC using the SvanPC software and the USB interface.



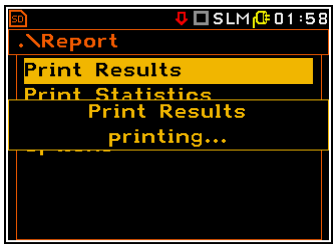
Report windows with the Print Results selected in Sound and Vibration modes

After pressing the **<ENTER>** push-button the instrument checks its current state. In the case when the measurements are performed, the printing is impossible and the message is displayed. In the case when no results were registered the below message is displayed.



Display after the attempt to Print Results when no results were registered

In the case when a measurement was already performed and a result is available, the message presented below is displayed.



Display in the Report list; the execution of the Print Results

When the message is on the display, the data are transferred from the instrument to the attached printer. The instrument returns to the **Report** list after transferring all data.

The exemplary report printed in A5 format *(path: <Menu> / Report / Options / Format A5)* with the **TITLE** "13MAR" looks as follows:

```
 (C) SVANTEK    SVAN 979      No.11219
2007/03/13   (v6.04/6.04.3)   13:06:57

TITLE:
  13MAR


------------ SETTINGS -----------

Device mode........: Sound Meter
Input..............: Microphone
Field correction...: FREE
Outdoor filter.....: Off
Device function....: Level Meter
Level Meter version: 6.04
Meas. start date...: 2007/03/13
Meas. start hour...: 13:01:40
Range..............: 137 dB
Measure trigger....: Off
Logger trigger.....: Off
Repeat cycle.......: Infinity
Start delay........: 1 s
Integration time...: 1 s
Calibr. factor.....: 0.0 dB
Leq integration....: Linear

Profile:    #1    #2    #3
Filter:     A     C     Z
Detector:   FAST  FAST  FAST
Logger:     None  None  None

--------------- Results --------------

Measurement time: 00:00:01

Prof.:   #1        #2        #3
Peak   75.5dB    99.2dB   100.7dB
Max    70.1dB    95.8dB    97.1dB
Min    70.0dB    95.6dB    96.9dB
SPL    70.1dB    95.8dB    97.1dB
LEQ    70.0dB    95.7dB    97.0dB
SEL    70.0dB    95.7dB    97.0dB
Ld     70.0dB    95.7dB    97.0dB
LEPd   70.0dB    95.7dB    97.0dB
Ltm3   70.1dB    95.8dB    97.1dB
Ltm5   70.1dB    95.8dB    97.1dB

L01    70.9dB    95.9dB    97.9dB
L10    70.9dB    95.9dB    97.9dB
L20    70.8dB    95.8dB    97.8dB
L30    70.7dB    95.7dB    97.7dB
L40    70.6dB    95.6dB    97.6dB
L50    70.5dB    95.5dB    97.5dB
L60    70.4dB    95.4dB    97.4dB
L70    70.3dB    95.3dB    97.3dB
L80    70.2dB    95.2dB    97.2dB
L90    70.1dB    95.1dB    97.1dB

-------------------------------------
```

Example of the printed results - A5 format

The same result's report printed in A4 format is presented below:

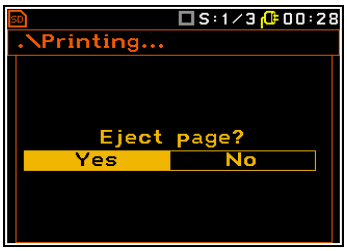
```
 (C) SVANTEK    SVAN 979      No.11219 2007/03/13   (v6.04/6.04.3)   13:03:07

TITLE:
  13MAR


----------- SETTINGS -----------      ------------ SETTINGS -----------

Device mode........: Sound Meter
Input..............: Microphone
Field correction...: FREE            Outdoor filter.....: Off
Device function....: Level Meter      Level Meter version: 6.04
Meas. start date...: 2007/03/13       Meas. start hour...: 13:01:40
Range..............: 137 dB          Measure trigger....: Off
Logger trigger.....: Off             Repeat cycle.......: Infinity
Start delay........: 1 s             Integration time...: 1 s
Calibr. factor.....: 0.0 dB           Leq integration....: Linear

Profile:    #1    #2    #3         Profile:    #1    #2    #3
Filter:     A     C     Z          Detector:   FAST  FAST  FAST
Logger:     None  None  None

-------------------- Results --------------------

Measurement time: 00:00:01

Prof.:    #1           #2           #3
Peak    75.5 dB      99.2 dB     100.7 dB
Max     70.1 dB      95.8 dB      97.1 dB
Min     70.0 dB      95.6 dB      96.9 dB
SPL     70.1 dB      95.8 dB      97.1 dB
LEQ     70.0 dB      95.7 dB      97.0 dB
SEL     70.0 dB      95.7 dB      97.0 dB
Ld      70.0 dB      95.7 dB      97.0 dB
LEPd    70.0 dB      95.7 dB      97.0 dB
Ltm3    70.1 dB      95.8 dB      97.1 dB
Ltm5    70.1 dB      95.8 dB      97.1 dB

L01     70.9 dB      95.9 dB      97.9 dB
L10     70.9 dB      95.9 dB      97.9 dB
L20     70.8 dB      95.8 dB      97.8 dB
L30     70.7 dB      95.7 dB      97.7 dB
L40     70.6 dB      95.6 dB      97.6 dB
L50     70.5 dB      95.5 dB      97.5 dB
L60     70.4 dB      95.4 dB      97.4 dB
L70     70.3 dB      95.3 dB      97.3 dB
L80     70.2 dB      95.2 dB      97.2 dB
L90     70.1 dB      95.1 dB      97.1 dB

------------------------------------------------
```

Example of the printed results from the Sound Meter mode (Level Meter) - A4 format

```
(C) SVANTEK    SVAN 979      No.11219 2007/03/13   (v6.04/6.04.3)   13:23:32

TITLE:
  VIBR


------------ SETTINGS -----------      ------------ SETTINGS -----------

Device mode........: Vibration Meter
Input..............: Accelerometer
Device function....: 1/3 Octave
Meas. start date...: 2007/03/13       Meas. start hour...: 13:12:32
Range..............: 708 m/s2         Ref.level for Acc..: 1 um/s2
Ref.level for Vel..: 1 nm/s           Ref.level for Dil..: 1 pm
Measure trigger....: Off             Logger trigger.....: Off
Repeat cycle.......: Infinity         Start delay........: 0 s
Integration time...: 10 s            Calibr. factor.....: 0.0 dB
RMS integration....: Linear           Spectrum filter....: Z
Spectrum in logger.: None

Profile:    #1    #2    #3         Profile:    #1    #2    #3
Filter:     HP1   HP3   HP10        Detector:   1.0s  1.0s  1.0s
Logger:     None  None  None

-------------------- Results --------------------

Measurement time: 00:00:09

Prof.:    #1           #2           #3
Peak    26.3  m/s2    26.3  m/s2    26.0  m/s2
P-P     51.9  m/s2    51.9  m/s2    51.3  m/s2
Max     13.2  m/s2    13.2  m/s2    13.2  m/s2
RMS     11.0  m/s2    11.0  m/s2    11.0  m/s2
VDV     22.6  m/s1.75  22.6  m/s1.75  22.6  m/s1.75

--- 1/3 Octave --        --- 1/3 Octave --        --- 1/3 Octave --

   [Hz]   [m/s2]           [Hz]   [m/s2]           [Hz]   [m/s2]
   0.80  3.43e-02          25.00  4.90e-03         800.00  9.23e-02
   1.00  3.05e-02          31.50  4.37e-03        1000.00  7.33e-02
   1.25  5.75e-02          40.00  2.92e-01        1250.00  3.94e-02
   1.60  1.07e-01          50.00  1.10e+01        1600.00  2.37e-02
   2.00  8.41e-02          63.00  1.45e+00        2000.00  2.21e-02
   2.50  1.19e-01          80.00  1.06e-02        2500.00  2.37e-02
   3.15  1.04e-01         100.00  6.24e-02        3150.00  1.82e-02
   4.00  6.68e-02         125.00  6.53e-02        4000.00  9.77e-03
   5.00  7.16e-02         160.00  6.46e-01        5000.00  8.13e-03
   6.30  4.22e-02         200.00  5.07e-02        6300.00  6.61e-03
   8.00  3.31e-02         250.00  5.50e-01        8000.00  6.76e-03
  10.00  2.00e-02         315.00  2.82e-01       10000.00  9.89e-03
  12.50  2.02e-02         400.00  2.00e-01       12500.00  1.07e-02
  16.00  1.50e-02         500.00  9.02e-02       16000.00  1.20e-02
  20.00  9.66e-03         630.00  2.14e-01       20000.00  1.16e-02

-------- TOTALS FOR Filters -------

 Filter Type   CF[dB]    Total
 R3     Acc     0.0   1.10e+01 m/s2
 HP3    Acc     0.0   1.10e+01 m/s2
 HP10   Acc     0.0   1.10e+01 m/s2

-----------------------------------
```

Example of the printed results from the Vibration Meter mode (1/3 Octave) - A4 format

The following confirmation question is displayed after the printing, if the **Prompt** parameter was selected in the **Eject Page** (*path: <Menu> / Report / Options*). The user has to answer in this case if the paper in the printer has to be ejected to the new page.



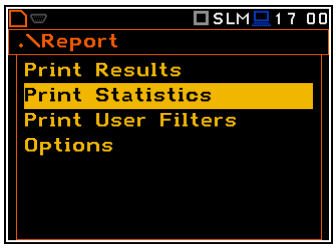
Displays with the confirmation request of the paper ejection

The similar message is displayed after sending out the statistics of the results and user filters to the printer (**Print Statistics** and **Print User Filters**).

The message about the time limit is displayed in the case when the printer (or a PC) is not connected or there is any other reason that it does not receive the data. The instrument waits for the reaction of the user (any push-button should be pressed except the **<Shift>** and **<Alt>** one) and after pressing a push-button it returns to the **Report** list. Another message is presented and the instrument waits for the reaction of the user in the case when there is no data to be printed.

10.2. Printing of the statistics of sound measurement results - Print Statistics

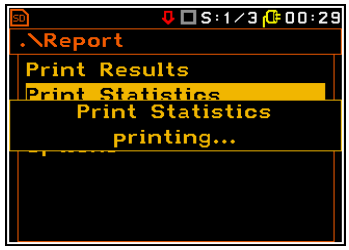
The **Print Statistics** enables the user to print the results of the statistics analysis on the attached printer. This position is not accessible for the Vibration measurements.



Report window with the Print Statistics selected

After pressing the **<ENTER>** push-button the instrument checks its current state. In the case when the measurements are performed, the printing is impossible and the message is displayed. In the case when no results were registered the below message is displayed.

In the case when a measurement was already performed and a result is available, the message presented below is displayed.



Display in the Report list; the execution of the Print Statistics

The following confirmation question is displayed after the printing, if the **Prompt** parameter was selected in the **Eject Page** (*path: <Menu> / Report / Options*). The user has to answer in this case if the paper in the printer has to be ejected to the new page.

The printed statistics examples (format A5 and A4) are presented below:

```
(C) SVANTEK     SVAN 979       No.11219
2007/03/14   (v6.04/6.04.3)   17:31:06

TITLE:
    10 MAR

------------ SETTINGS -----------

Device mode........: Sound Meter
Input..............: Microphone
Field correction...: FREE
Outdoor filter.....: Off
Device function....: 1/1 Octave
Meas. start date...: 2007/03/14
Meas. start hour...: 17:30:50
Range..............: 137 dB
Measure trigger....: Off
Logger trigger.....: Level -
Logger trig.source.: RMS(1)
Logger trig.level..: 100 dB
Trig.'prev'probes..: 0
Trig.'post'probes..: 0
Repeat cycle.......: Infinity
Start delay........: 0 s
Integration time...: 10 s
Calibr. factor.....: 22.0 dB
Calibration by.....: Sensitivity
Calibration date...: 2007/03/14
Calibration hour...: 16:26:28
Leq integration....: Exponent.
Spectrum filter....: Z
Spectrum in logger.: None

Profile:     #1     #2     #3
Filter:      A      C      Z
Detector:    FAST   FAST   FAST
Logger:      Peak   Max    Peak
             Max    RMS    Max
             Min
             RMS

--------- Statistics --------

Measurement time: 00:00:05

Profile:     #1     #2     #3
          [dB A] [dB C]   [dB]
   L01     71.5   69.5   72.5
```

L02	71.0	69.0	72.0
L03	69.5	67.5	69.5
L04	69.0	67.0	69.0
L05	67.5	65.5	68.5
L06	67.0	65.0	68.0
L07	59.5	57.5	60.5
L08	59.0	57.0	60.0
L09	55.5	53.5	57.5
L10	55.0	53.0	57.0
L11	51.5	50.5	53.5
L12	51.0	50.0	53.0
L13	50.5	48.5	52.9
L14	50.0	48.0	52.9
L15	49.7	47.8	52.8
L16	49.5	47.6	52.8
L17	49.2	47.5	52.7
L18	49.0	47.3	52.7
L19	48.9	47.1	52.6
L20	48.9	47.0	52.6
L21	48.9	46.9	52.5
L22	48.9	46.9	52.5
L23	48.9	46.9	52.5
L24	48.9	46.9	52.4
L25	48.8	46.9	52.4
L26	48.8	46.9	52.3
L27	48.8	46.9	52.3
L28	48.8	46.8	52.2
L29	48.8	46.8	52.2
L30	48.8	46.8	52.1
L31	48.8	46.8	52.1
L32	48.7	46.8	52.0
L33	48.7	46.8	52.0
L34	48.7	46.8	52.0
L35	48.7	46.7	51.9
L36	48.7	46.7	51.9
L37	48.7	46.7	51.9
L38	48.6	46.7	51.9
L39	48.6	46.7	51.9
L40	48.6	46.7	51.9
L41	48.6	46.7	51.8
L42	48.6	46.7	51.8
L43	48.6	46.6	51.8
L44	48.6	46.6	51.8
L45	48.5	46.6	51.8
L46	48.5	46.6	51.8
L47	48.5	46.6	51.8
L48	48.5	46.6	51.7
L49	48.5	46.6	51.7
L50	48.5	46.5	51.7
L51	48.5	46.5	51.7
L52	48.4	46.5	51.7
L53	48.4	46.5	51.7
L54	48.4	46.5	51.6
L55	48.4	46.5	51.6
L56	48.4	46.5	51.6
L57	48.4	46.5	51.6
L58	48.3	46.4	51.6
L59	48.3	46.4	51.6
L60	48.3	46.4	51.6
L61	48.3	46.4	51.5
L62	48.3	46.4	51.5
L63	48.3	46.4	51.5
L64	48.3	46.4	51.5
L65	48.2	46.3	51.5
L66	48.2	46.3	51.5
L67	48.2	46.3	51.5
L68	48.2	46.3	51.4
L69	48.2	46.3	51.4

L70	48.2	46.3	51.4
L71	48.1	46.3	51.4
L72	48.1	46.2	51.4
L73	48.1	46.2	51.4
L74	48.1	46.2	51.3
L75	48.1	46.2	51.3
L76	48.1	46.2	51.3
L77	48.1	46.2	51.3
L78	48.0	46.2	51.3
L79	48.0	46.2	51.3
L80	48.0	46.1	51.3
L81	48.0	46.1	51.2
L82	48.0	46.1	51.2
L83	48.0	46.1	51.2
L84	48.0	46.1	51.2
L85	47.9	46.1	51.2
L86	47.8	46.1	51.2
L87	47.8	46.0	51.1
L88	47.7	46.0	51.1
L89	47.6	46.0	51.1
L90	47.6	46.0	51.1
L91	47.5	46.0	51.1
L92	47.5	46.0	51.1
L93	47.4	46.0	51.1

Example of the printed statistics from the Voltage (Sound) mode (1/1 Octave) - format A5

(C) SVANTEK SVAN 979 No.11219 2007/03/13 (v6.04/6.04.3) 13:50:36

TITLE: Hotel

---------- SETTINGS ---------- ---------- SETTINGS ----------

Device mode.....: Sound Meter
Input.....: Microphone
Field correction...: FREE Outdoor filter.....: Off
Device function....: Dose Meter
Meas. start date...: 2007/03/13 Meas. start hour...: 13:49:08
Range.....: 137 dB Criterion level....: 80 dB
Threshold level....: None Exchange rate.....: 3 dB
Exposure time.....: 08h00 Measure trigger....: Off
Logger trigger.....: Off Repeat cycle.....: Infinity
Start delay.....: 0 s Integration time...: 10 s
Calibr. factor.....: 0.0 dB Leq integration....: Linear

Profile:	#1	#2	#3	Profile:	#1	#2	#3
Filter:	A	C	Z	Detector:	FAST	FAST	FAST
Logger:	None	None	None				

--------- Statistics -------- --------- Statistics --------

Measurement time: 00:00:02

Profile:	#1 [dB A]	#2 [dB C]	#3 [dB]	Profile:	#1 [dB A]	#2 [dB C]	#3 [dB]
L01	62.8	66.8	70.8	L51	56.7	62.3	66.9
L02	62.6	66.6	70.6	L52	56.7	62.3	66.9
L03	62.4	66.4	70.4	L53	56.6	62.2	66.8
L04	62.2	66.2	70.2	L54	56.6	62.2	66.8
L05	62.0	66.0	70.0	L55	56.6	62.2	66.7
L06	61.8	65.8	69.8	L56	56.5	62.1	66.7
L07	61.6	65.6	69.6	L57	56.5	62.1	66.6
L08	61.4	65.4	69.4	L58	56.4	62.0	66.6
L09	61.2	65.2	69.2	L59	56.4	62.0	66.5
L10	61.0	65.0	69.0	L60	56.4	62.0	66.5
L11	59.9	64.8	68.9	L61	56.3	61.9	66.4
L12	59.8	64.6	68.9	L62	56.3	61.9	66.4

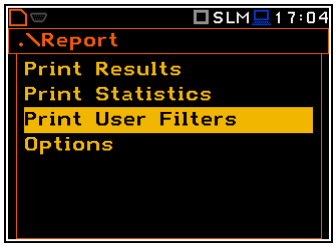
L13	59.7	64.4	68.8	L63	56.2	61.8	66.3
L14	59.6	64.2	68.8	L64	56.2	61.8	66.3
L15	59.5	64.0	68.8	L65	56.2	61.8	66.2
L16	59.4	63.9	68.7	L66	56.1	61.7	66.2
L17	59.3	63.9	68.7	L67	56.1	61.7	66.1
L18	59.2	63.8	68.6	L68	56.0	61.6	66.1
L19	59.1	63.8	68.6	L69	56.0	61.6	66.0
L20	59.0	63.7	68.6	L70	56.0	61.6	66.0
L21	58.9	63.7	68.5	L71	55.8	61.5	65.8
L22	58.9	63.6	68.5	L72	55.6	61.5	65.6
L23	58.8	63.6	68.4	L73	55.4	61.4	65.4
L24	58.8	63.5	68.4	L74	55.2	61.4	65.2
L25	58.7	63.5	68.4	L75	55.0	61.4	65.0
L26	58.7	63.4	68.3	L76	54.9	61.3	64.9
L27	58.6	63.4	68.3	L77	54.8	61.3	64.8
L28	58.6	63.3	68.2	L78	54.7	61.2	64.7
L29	58.5	63.3	68.2	L79	54.6	61.2	64.6
L30	58.5	63.2	68.2	L80	54.5	61.2	64.5
L31	58.4	63.2	68.1	L81	54.4	61.1	64.4
L32	58.4	63.1	68.1	L82	54.3	61.1	64.3
L33	58.3	63.1	68.0	L83	54.2	61.0	64.2
L34	58.3	63.0	68.0	L84	54.1	61.0	64.1
L35	58.2	63.0	68.0	L85	54.0	61.0	64.0
L36	58.2	62.9	67.9	L86	52.9	60.9	63.9
L37	58.1	62.9	67.8	L87	52.8	60.8	63.8
L38	58.1	62.8	67.8	L88	52.7	60.7	63.8
L39	58.0	62.8	67.7	L89	52.6	60.6	63.7
L40	58.0	62.8	67.6	L90	52.5	60.5	63.6
L41	57.8	62.7	67.6	L91	52.4	60.4	63.6
L42	57.6	62.7	67.5	L92	52.3	60.3	63.5
L43	57.4	62.6	67.4	L93	52.2	60.2	63.4
L44	57.2	62.6	67.4	L94	52.1	60.1	63.4
L45	57.0	62.6	67.3	L95	52.0	60.0	63.3
L46	56.9	62.5	67.2	L96	51.8	59.8	63.2
L47	56.9	62.5	67.2	L97	51.6	59.6	63.2
L48	56.8	62.4	67.1	L98	51.4	59.4	63.1
L49	56.8	62.4	67.0	L99	51.2	59.2	63.0
L50	56.8	62.4	67.0				

Example of the printed statistics from the Sound Meter mode (Dose Meter) - format A4

The message about the time limit is displayed in the case when the printer is not connected or there is any other reason that it does not receive the data. The instrument waits for the reaction of the user (any push-button should be pressed except the **<Shift>** and **<Alt>**) and after pressing a push-button it returns to the **Report** list. Another message is presented and the instrument waits for the reaction of the user in the case when there is no data to be printed.

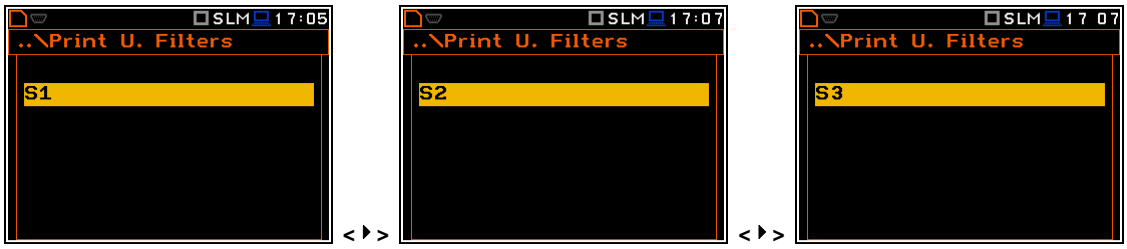
10.3. Printing of the coefficients of the user filters - Print User Filters

The **Print User Filters** enables the user to print out the values of the user filters introduced in the instrument: **S1**, **S2**, **S3**.



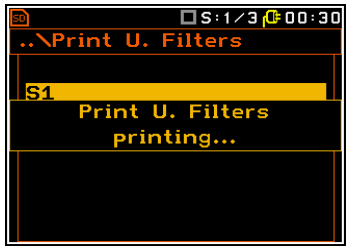
Report windows with the Print User Filters selected

The selection of the **User Filter** is made by means of the < ◂ >, < ▸ > push buttons.



Print User Filters windows; the user filter selection

The contents of the selected file is sent out to the attached printer (or to a PC) after pressing the **<ENTER>** push-button. The following message is displayed on the display during the printing:



Display in the Report list; the execution of the Print User Filters

When the message is on the display, the data are transferred from the instrument to the attached printer (or PC). The instrument returns to the **Report** list after transferring all data.

In the case when the printer or PC is not connected or there is any other reason that it does not receive the data the message about the time limit is displayed. The instrument waits for the reaction of the user (any push-button should be pressed except the **<Shift>** and **<Alt>**) and after pressing a push-button it returns to the **Report** list.

The exemplary **User Filter** coefficients printed in A4 format look as follows:

(C) SVANTEK SVAN 979 No.11219 2007/03/15 (v6.04/6.04.3) 15:36:53

Sound meter mode filter

------- S1 ------		------- S1 ------		------- S1 ------	
[Hz]	[dB]	[Hz]	[dB]	[Hz]	[dB]
0.80	-INF	25.00	40.0	800.00	10.0
1.00	-100.0	31.50	50.0	1000.00	0.0
1.25	-90.0	40.00	60.0	1250.00	-10.0
1.60	-80.0	50.00	70.0	1600.00	-20.0
2.00	-70.0	63.00	80.0	2000.00	-30.0
2.50	-60.0	80.00	90.0	2500.00	-40.0
3.15	-50.0	100.00	100.0	3150.00	-50.0
4.00	-40.0	125.00	90.0	4000.00	-60.0
5.00	-30.0	160.00	80.0	5000.00	-70.0
6.30	-20.0	200.00	70.0	6300.00	-80.0
8.00	-10.0	250.00	60.0	8000.00	-90.0
10.00	0.0	315.00	50.0	10000.00	-100.0
12.50	10.0	400.00	40.0	12500.00	-INF
16.00	20.0	500.00	30.0	16000.00	-INF
20.00	30.0	630.00	20.0	20000.00	-INF

---------- ---------- ----------

Example of the printed coefficients of the user filter S1- format A4

(C) SVANTEK SVAN 979 No.11219
2007/03/15 (v6.04/6.04.3) 15:49:07

Sound meter mode filter

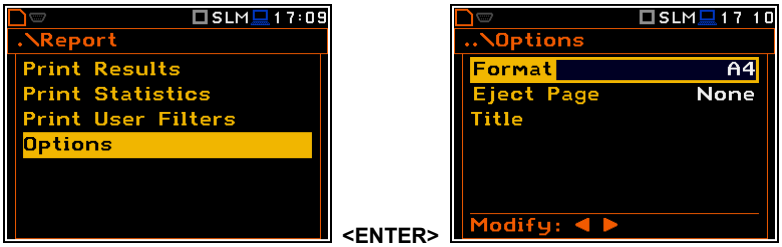
------- S2 ------		------- S2 ------	
[Hz]	[dB]	[Hz]	[dB]
0.80	-INF	160.00	1.0
1.00	-INF	200.00	1.0
1.25	-INF	250.00	1.0
1.60	-INF	315.00	3.0
2.00	0.0	400.00	3.0
2.50	0.0	500.00	3.0
3.15	0.0	630.00	1.0
4.00	0.0	800.00	1.0
5.00	0.0	1000.00	1.0
6.30	0.0	1250.00	1.0
8.00	0.0	1600.00	1.0
10.00	0.0	2000.00	0.0
12.50	0.0	2500.00	0.0
16.00	0.0	3150.00	0.0
20.00	0.0	4000.00	0.0
25.00	0.0	5000.00	0.0
31.50	0.0	6300.00	0.0
40.00	0.0	8000.00	0.0
50.00	0.0	10000.00	-INF
63.00	0.0	12500.00	-INF
80.00	0.0	16000.00	-INF
100.00	1.0	20000.00	-INF
125.00	0.0		

---------- ----------

Example of the printed coefficients of the user filter S2 - format A5

10.4. Selection of the printing options – Options

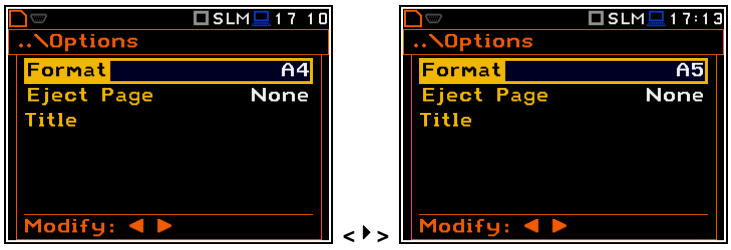
Using the **Options** the user can select the format of the listing (**Format**), can control the way the paper is ejected in the printer (**Eject Page**) and edit the title of the report (**Title**).



Report windows with the Options selected

Selection of the format of the print out – **Format**

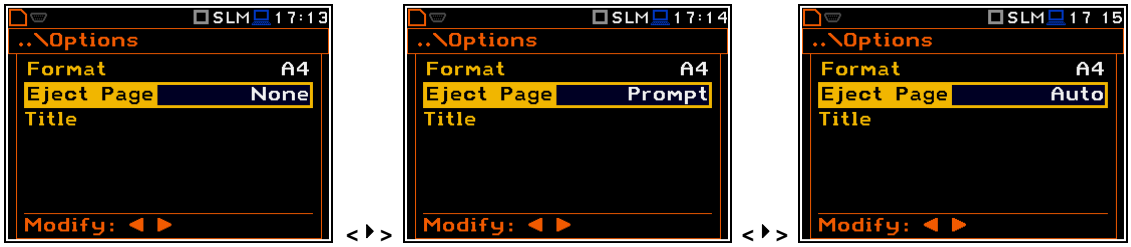
The **Format** enables the user to select the format of the listing (**A4** and **A5** options are available).



Options windows; the selection of the format

Controlling the paper ejection after print out - **Eject Page**

The **Eject Page** enables the user to control the ejection of the paper after the listing is done. The following options are available: **Prompt** (the instrument asks whether to eject the page after printing report, statistics or catalogue), **Auto** (after printing, the paper is ejected) and **None** (the paper is not ejected after printing). In particular, it is possible to have one result after another using the **None** or **Prompt** options.



Options windows; the selection of the paper ejection

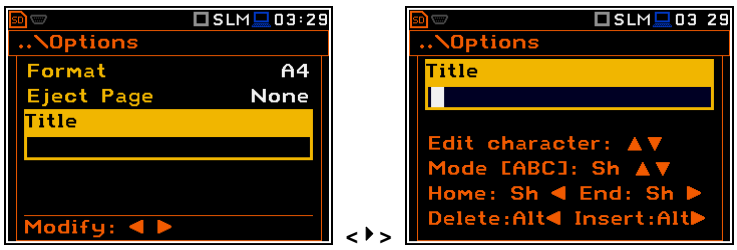
The request is displayed after the printing of the measurement results, the statistics of the results, (**Print Results**, **Print Statistics**, **Print User Filters**) if the **Prompt** parameter was selected in the **Eject Page** position of the **Options** sub-list. The user has to answer in this case if the paper in the printer has to be ejected to the new page. The change of the available answers is possible after pressing the **< >**, **< >** push-buttons. The return to the **Report** list is performed after pressing the **<ENTER>** push-button with the possible ejection of the paper to the new page.

The message about the time limit is displayed in the case when the printer is not connected or there is any other reason that it does not eject a paper. The instrument waits for the reaction of the user (any push-

button should be pressed except the **<Shift>** one) and after pressing a push-button it returns to the **Report** list.

Edition of the user's text to be added to the reports – **Title**

The **Title** position enables the user to edit the text added to the file and to the report to be printed. The text edition is performed in the special window which is opened by means of the **< ◀ >**, **< ▶ >** push-buttons.



Displays in the text edition of the report's header

11. 1/1 AND 1/3 OCTAVE ANALYSER

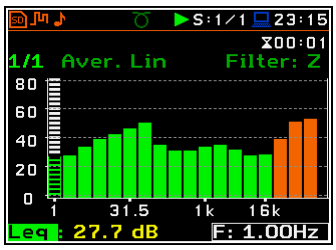
The instrument operates as **1/1 Octave** or **1/3 Octave** analyser in a very similar way to the **Level Meter** mode and, in addition, **1/1 Octave** or **1/3 Octave** analysis is performed in parallel with the **SLM** or **VLM** operations. All 1/1-octave (with the centre frequencies from 16 kHz down to 1 Hz; in base two system) and 1/3-octave (with the centre frequencies from 20 kHz down to 0.8 Hz; in base two system) digital pass-band filters are working in the real-time with the weighting filters (**Z**, **A** or **C** - in the case of sound analysis: **Z** - in the case of vibration analysis) selected in the **Spectrum** (*path: Menu / Measurement / Spectrum / Filter*) and the linear RMS detector.

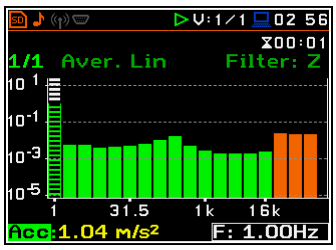
Notice: *The TOTAL RMS results are measured with the weighting filters (**A**, **C**, **Z** or **S1**, **S2**, **S3** - in the case of sound measurements; **HP**, **PR2**, **PR3** or **S1**, **S2**, **S3** – in the case of vibration measurements) without taking into account the settings of the level meters for profiles. The spectra are always linearly averaged. Thus, the **TOTAL** values from **1/1 Octave** or **1/3 Octave** analysis can be different from those obtained for the profiles (if the **RMS Integration** was set as **Exp**).*

The **SVAN 979** instrument operates in two ranges, called **Low** and **High**, which can be selected in the **Range** window *(path: <Menu> / Measurement / Range)*.

The results of **1/1 Octave** and **1/3 Octave** analysis (so-called spectrum) can be examined by the user on a display in **Spectrum** presentation mode. The availability of this mode can be switched on or off by the user (*path: <Menu> / Display / Display Modes*).

1/1 Octave and **1/3 Octave** spectrum for all centre frequencies of pass-band filters together with the **Total RMS** values measured with selected by the user weighting filters are presented in the switched on **Spectrum** mode. The read-out of the interested value of spectrum can be done in Sound modes and in Vibration modes of the presentation.

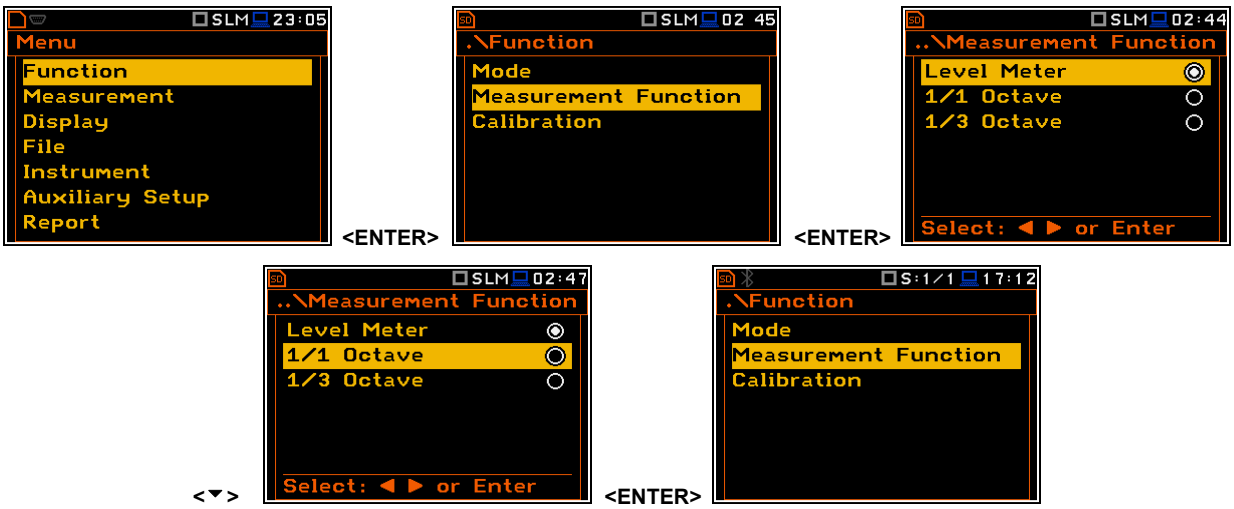
a) 

b) 

1/1 Octave analysis in Spectrum display mode in sound (a) and vibration (b) modes

11.1. Selection of 1/1 Octave or 1/3 Octave analysis mode

In order to select the **1/1 Octave** or **1/3 Octave** analysis mode the user has to enter the **Function** list by pressing the **<Menu>** push-button, then - select by means of the **<▲>** or **<▼>** push-buttons the **Function** text and press the **<ENTER>** one. Then, the user has to open the **Measurement Function** window (to select the **Measurement Function** text using the **<▲>**, **<▼>** push-buttons and press the **<ENTER>** one when this text is displayed inversely).



1/1 Octave analysis mode activation

***Notice**: It is not possible to change the current function during the measurements. The instrument displays in this case for about 2 seconds the text: **"Measurement in Progress"**. In order to change the current measurement function the instrument must be stopped!*

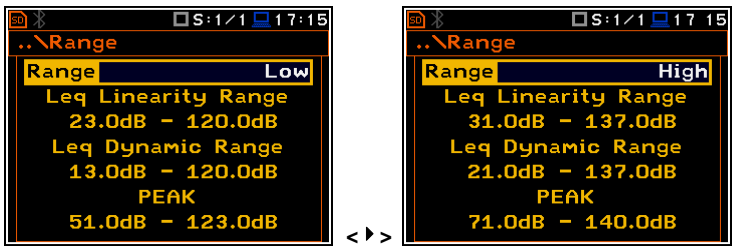
11.2. Selection of parameters of 1/1 Octave and 1/3 Octave analysis

The execution of **1/1 Octave** or **1/1 Octave** analysis depends on the certain number of the parameters, which can be set in the different windows of the **Measurement** list. Namely, the user can set there the range of the measurements (*path: <Menu> / Measurement / Range*) and **Filter** (*path: <Menu> / Measurement / Spectrum*). Additionally, the user can set or be informed about the **Band** of the analysis (*path: <Menu> / Measurement / Spectrum / Band*) and switch on or off the registration of the spectra in the logger file (*path: <Menu> / Measurement / Logging / Logger Results*).

The output of the selected **1/1 Octave** or **1/3 Octave** filter can be also used as the triggering signal in **Logger Trigger** window (*path: <Menu> / Measurement / Logging / Logger Trigger*).

11.3. Measurement range selection in 1/1 Octave and 1/3 Octave analysis - Range

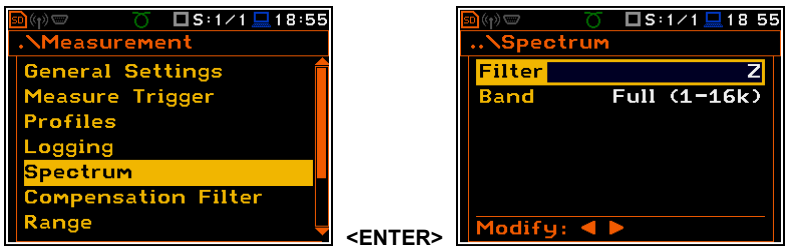
In **1/1 Octave** or **1/3 Octave** analyser the user can select the input ranges specified in Appendix C, named as **Low** and **High**. The selection of the input range is possible after entering the **Range** window of the **Measurement** list.



Range window in 1/1 Octave analyser

11.4. Setting the parameters of 1/1 Octave and 1/3 Octave analysis - Spectrum

In **1/1 Octave** or **1/3 Octave** mode on the **Measurement** list a context element (**Spectrum**) appears (*path: <Menu> / Measurement / Spectrum)*. Using the **Spectrum** window one can select the weighting filter and the band in the case of sound measurements.



Spectrum window opening for 1/1 octave sound analysis

The following weighting filters are available in **1/1 Octave** and **1/1 Octave** analysis of sound:

- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **B** type 1 according to the IEC 651 standard,
- **Z** type 1 according to the IEC 61672-1 standard
- **HP** type 1 according to the IEC 61672-1 standard

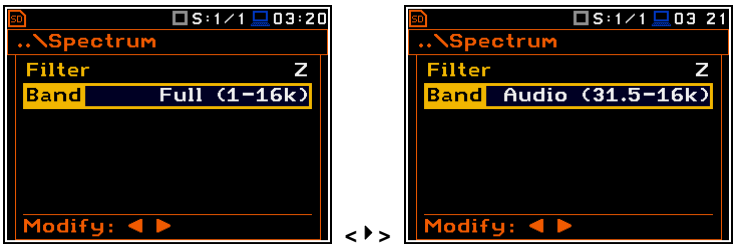
The only one weighting filter is available in **1/1 Octave** and **1/1 Octave** analysis of vibration: **HP**

Spectrum window; the Filter selection in the Sound modes

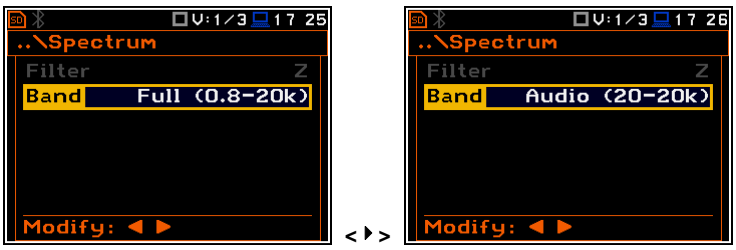
The characteristics of the filters are given in Appendix D.

In the **Band** position the user can select the band in which the **1/1 Octave** or **1/3 Octave** analysis of signal has to be performed. The **Band** position is accessible only in Sound modes. The user has two possibilities: **Full** band (**1 Hz – 16 kHz**) and **Audio** band (**31.5 Hz – 16 kHz**).

Notice: *In the case of vibration measurements only* ***Full*** *band (****1 Hz – 16 kHz****) is available.*



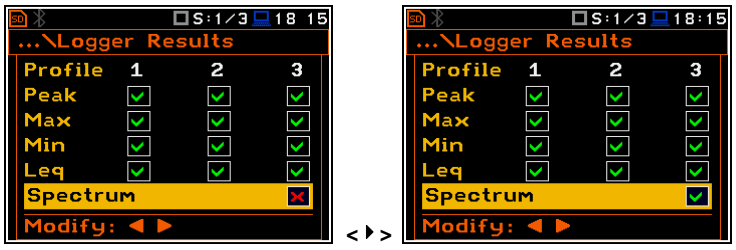
Spectrum window; the Band selection in 1/1 Octave mode



Spectrum window; the Band selection in 1/3 Octave mode

11.5. Activation of saving of 1/1 Octave and 1/3 Octave analysis results in the logger's file - Logger Results

The **RMS** results from **1/1 Octave** or **1/1 Octave** analysis can be saved in the logger's file. The enabling of spectrum saving in the logger file is made by activation / deactivation the **Spectrum** position by means of the **< ◀ >**, **< ▶ >** push-buttons.



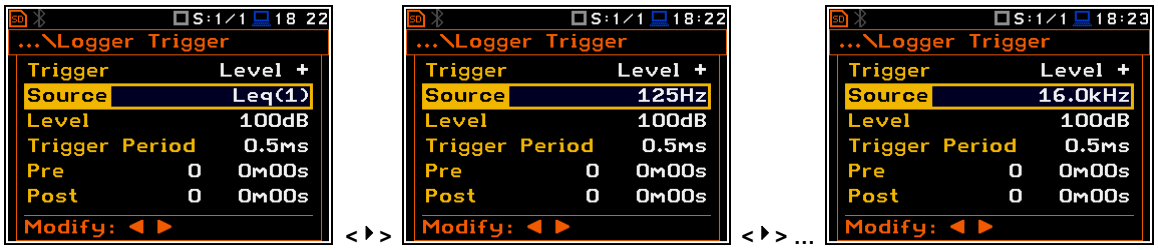
Spectrum windows with disabled and enabled savings of 1/1 Octave spectrum

11.6. Selection of the result which triggers registration in logger in 1/1 Octave and 1/3 Octave analysis - Logger Trigger

In **SLM** mode only the **Leq** result coming from the first profile (**Leq(1)**) is used for triggering the measurement results registration in the logger of the instrument. The **Source** position in the **Logger Trigger**

window is not accessible in that mode. However, in **1/1 Octave** or **1/1 Octave** analysis it is possible to access mentioned above position and to make a selection.

The results coming from the output of **1/1 Octave** filters (**125 Hz**, **250 Hz**, **500 Hz**, **1.00 kHz**, **2.00 kHz**, **4.00 kHz**, **8.00 kHz** and **16.0 kHz**), or **1/3 Octave** filters (**125 Hz**, **160 Hz**, **200 Hz**, **250 Hz**, **315 Hz**, **400 Hz**, **500 Hz**, **630 Hz**, **800 Hz**, **1.00 kHz**, **1.25 kHz**, **1.60 kHz**, **2.00 kHz**, **2.50 kHz**, **3.15 kHz**, **4.00 kHz**, **5.00 kHz**, **6.30 kHz**, **8.00 kHz 10.00 kHz**, **12.50 kHz**, **16.0 kHz** and **20.0 kHz**), are available as well as **Leq** result from the first profile.



Logger Trigger windows; the selection of the signal used for triggering

11.7. Display options in 1/1 Octave and 1/3 Octave analysis mode

The **Display** list is used for setting the various parameters, which are mainly dedicated for the control of the display. The following windows contain the elements that influence the presentation of the results of **1/1 Octave** and **1/3 Octave** analysis:

Display Modes enables one to select the mode of the presentation of **1/1 Octave** or **1/3 Octave** analysis;

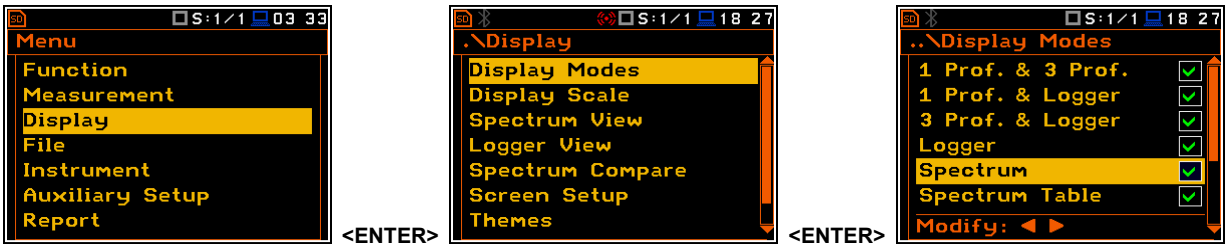
Display Scale enables one to change the scale of the vertical and horizontal axis of the graphical presentation, switch on and off the grid, switch on or off grid and autoscale;

Spectrum View enables one to choose the type of the spectrum to be presented;

Logger View enables one to select and present the results of the analysis stored in the files of the logger.

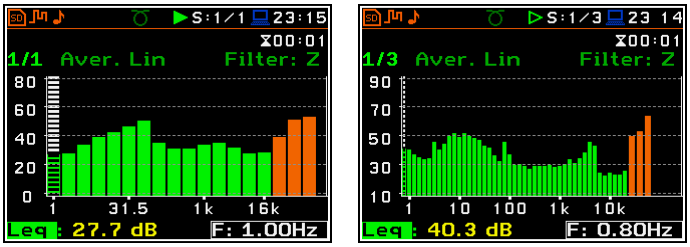
11.8. Presentation of 1/1 Octave and 1/3 Octave analysis results

The **Spectrum** and **Spectrum Table** positions of the **Display Modes** list are accessible only for **1/1 Octave** and **1/3 Octave** functions.

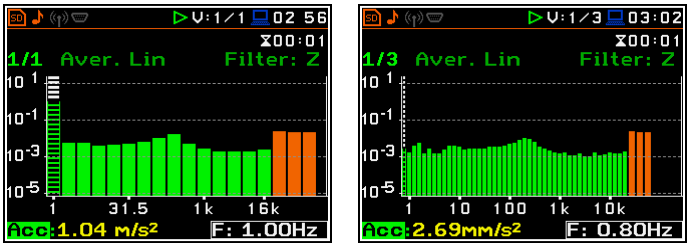


Display Modes window with available modes of presentation

When **Spectrum** mode is switched on the measurement screen in Spectrum visualisation mode is like below.

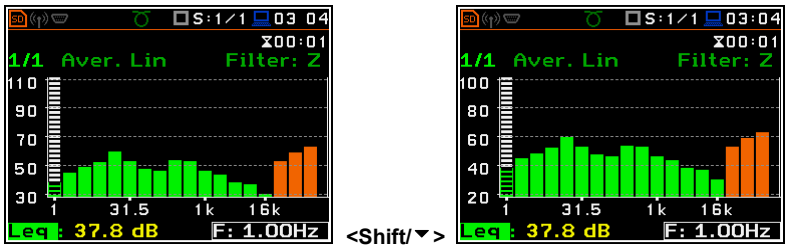


Displays in Spectrum view for 1/1 Octave and 1/3 Octave function (Sound modes)



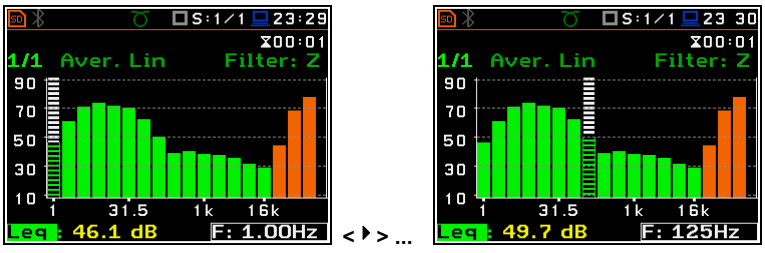
Displays in Spectrum view for 1/1 Octave and 1/3 Octave function (Vibration modes)

The user may shift the Y-axis during the spectrum presentation after pressing the **<Shift>** and **<▲>** (or the **<Shift>** and **<▼>**) push-buttons.

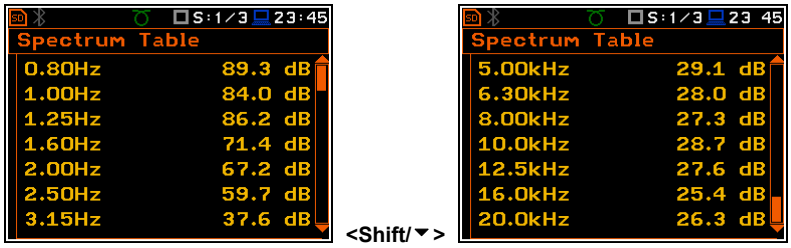


1/1 Octave analysis with the shifted horizontal axis in relation to vertical one

The user may change the cursor position by means of the **<◀>**, **<▶>** push-buttons. The frequency and appropriate value are presented in the line below the plot.



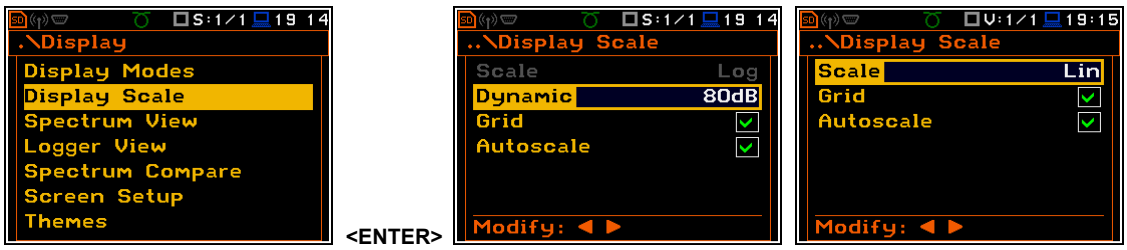
Change the cursor position for the 1/1 Octave spectrum



Displays in Spectrum Table view for 1/3 Octave function (Sound modes)

11.9. Setting the scale of the measurement results presentation - Scale

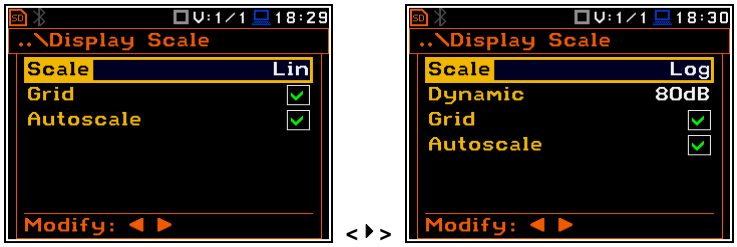
The **Display Scale** sub-list enables the user to change the scale in the available modes of graphical presentation of the measurement results and switch on/off the grid.



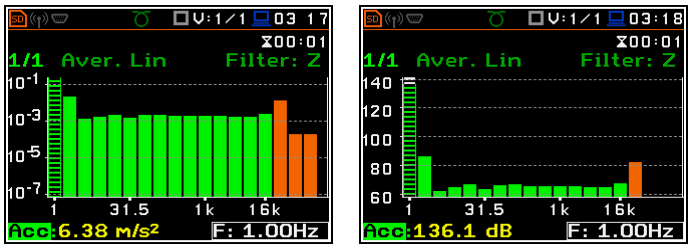
Display Scale windows in Sound and Vibration modes

Setting the scale of the measurement results presentation – **Scale**

The **Scale** position is accessible only in the case of Vibration measurement modes. Two options are available: **Lin** (linear) and **Log** (logarithmic). In the case of the first one the graphical presentation and the units both are linear. In the latter case the graphical presentation is given in the logarithmic scale and the measurement results are expressed in decibels (the result is related to the values set in the **Reference Level** (*path: <Menu> / Auxiliary Setup / Reference Levels*). In the case of the sound measurements the **Scale** position is not active. All results are presented in the logarithmic scale.



Display Scale window, scale selection in vibration modes

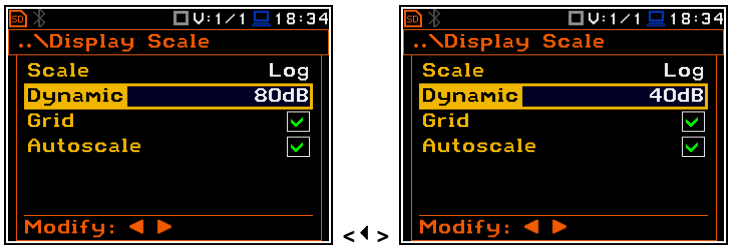


Vibration results presented in linear and logarithmic scale

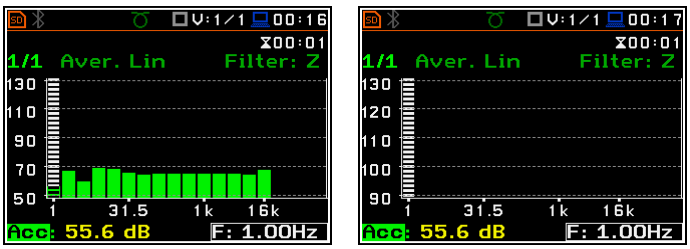
Scaling the vertical axis of the graphical mode presentation – **Dynamic**

The **Dynamic** position enables the user to select the proper scaling of the graphical mode presentation. In the case of the vertical axis one can obtain the double, four times and eight times expansion

(as the default the vertical axis corresponds to 80 dB, after expansion it corresponds to 40 dB, 20 dB and 10 dB – respectively).



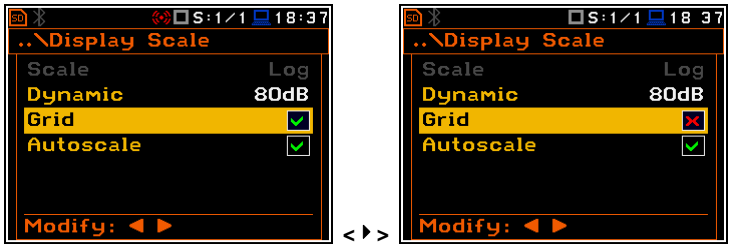
Dynamic parameter changing



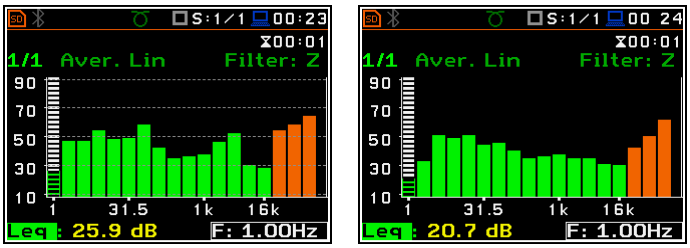
Displays with the 1/1 Octave results presented with different Dynamic parameter (80 and 40 dB)

Switching on/off the grid in the graphical mode presentation – **Grid**

The **Grid** enables the user to switch on or off the grid in any graphical presentation.



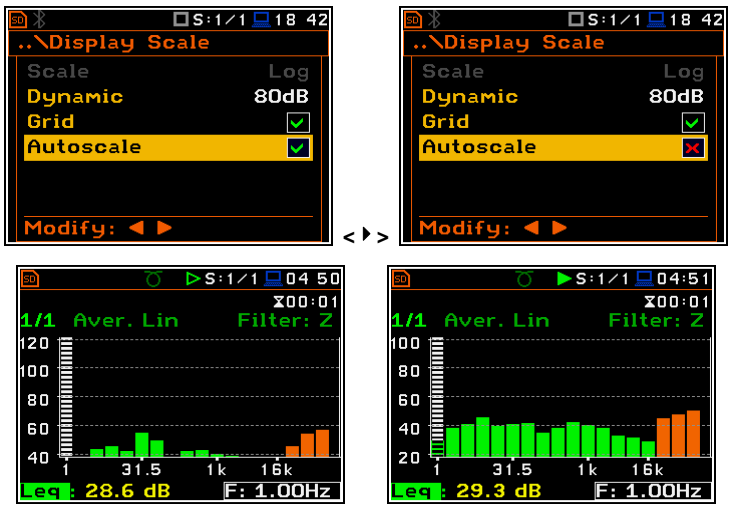
Grid option selection and switching it off



Displays with the grid switched on and off

Switching on/off the automatic Y-scale adjustment – **Autoscale**

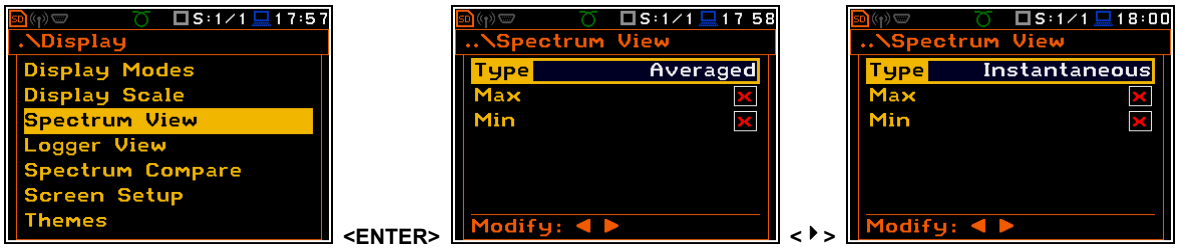
The **Autoscale** position switch on the automatic adjustment of scale Y.



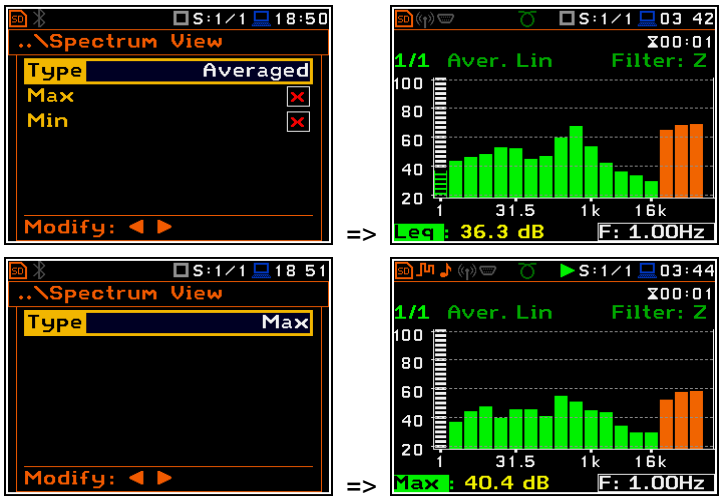
Displays with the Autoscale switched on and off

11.10. Setting the parameters of the spectrum presentation - Spectrum View

The user can select the different spectra to be visible on the display in the **Spectrum View** window (*path: <Menu> / Display / Spectrum View*). In the **Spectrum View** window the following spectrum types may be selected: **Averaged**, **Instantaneous**, **Max** or **Min**.

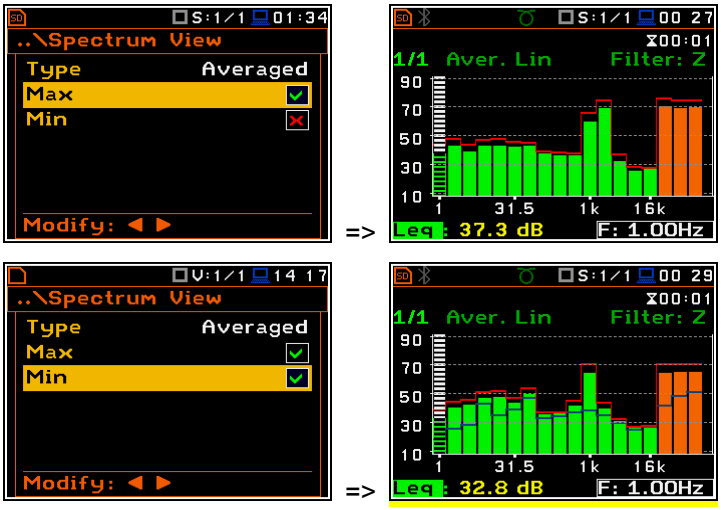


Spectrum View window opening



Presentation of different 1/1 Octave spectra

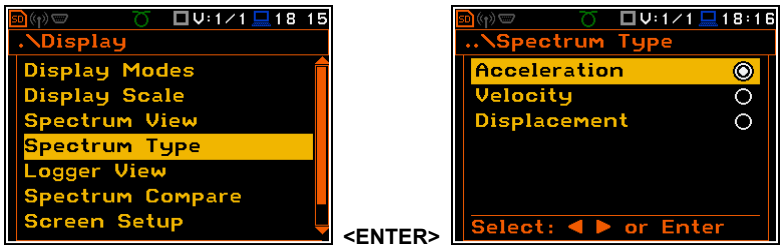
In the case when the **Averaged** or **Instantaneous** spectrum is selected the user can additionally switch on or off the presentation of **Max** and/or **Min** spectrum by placing or replacing the special character in the displayed inversely line with the **Max** or **Min** text by means of the **<◄>**, **<►>** push-buttons.



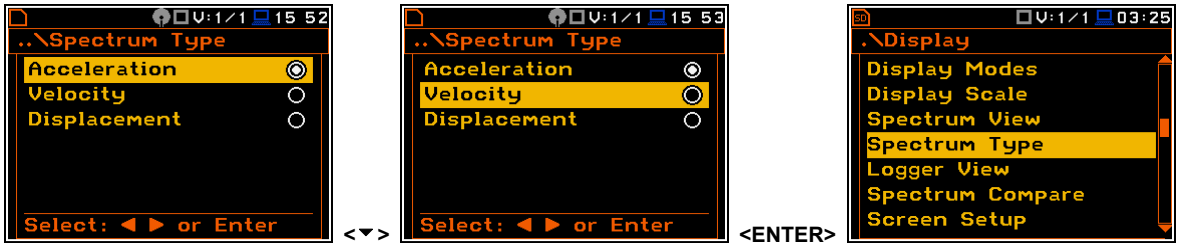
Max and Min spectra presented on the spectrum plot

11.11. Selection of the Spectrum Type in Vibration mode - Spectrum Type

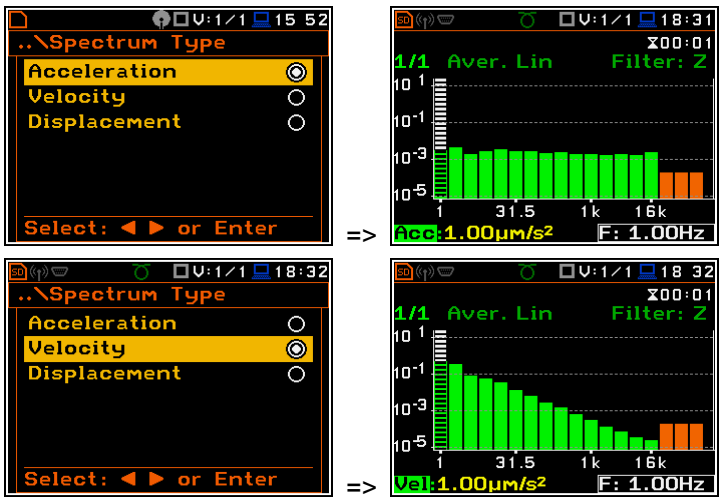
The user can select the different type of spectrum for vibration measurements to be presented on the display in the **Spectrum Type** window (*path: <Menu> / Display / Spectrum Type*). The **Spectrum Type** position is available only while Vibration modes and in the **Spectrum Type** window the following spectrum types can be selected: **Averaged**, **Instantaneous**, **Max** or **Min**.



Spectrum Type window opening



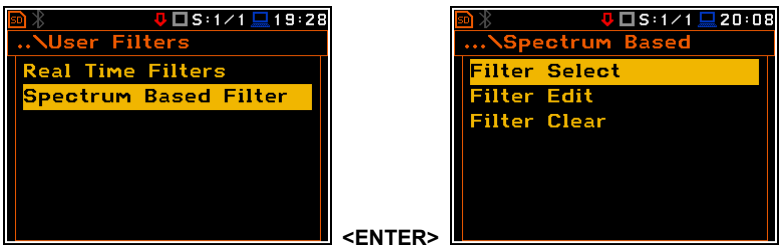
Spectrum Type window; Velocity option selection



Presentation of different types of 1/1 Octave spectra for vibration

11.12. Setting filter coefficients for 1/1 Octave and 1/3 Octave analysis - Spectrum Based Filter

The **Spectrum Based Filter** sub-list enables the user to introduce the values of the filter coefficients correcting the results of **1/1 Octave** or **1/3 Octave** analysis. The results of the analysis (the Total values) can be modified by the introduced factors.



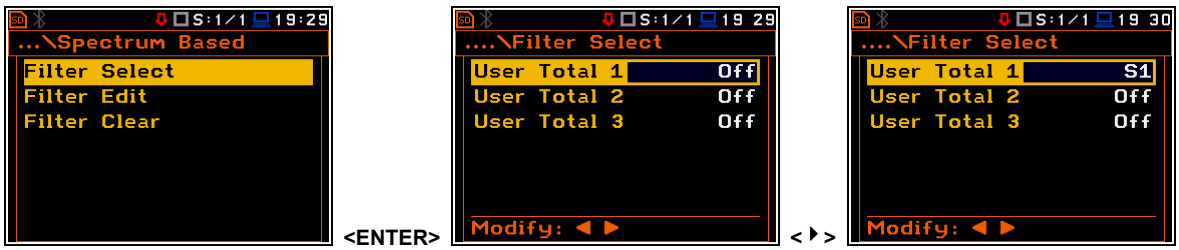
User Filters window, Spectrum Based Filter window opening

11.16.1. Selection the user filter for total value calculation – Filter Select

The **Filter Select** sub-list enables one to select the filter **S1**, **S2** or **S3**, used for calculation of the Total values. The filter selection is different for Sound and Vibration modes.

Sound modes

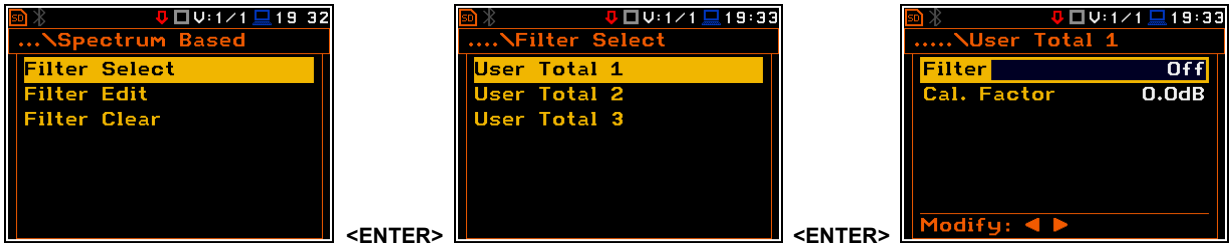
In the **Filter Select** window one can select one of three mentioned above filters (**S1**, **S2** and **S3**) for **1**, **2** or **3 User Total** values calculations. The selection of the filter in this sub-list is performed by means of the **<◄>**, **<►>** push-buttons.



Spectrum Based Filter window, the Filter Select window opening in Sound modes

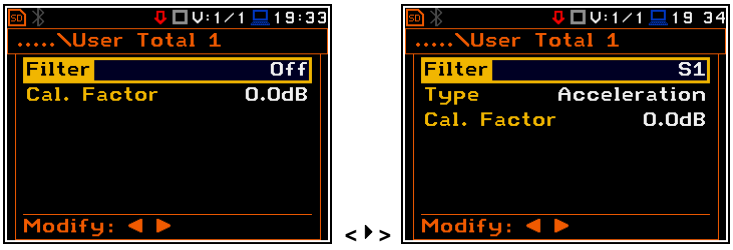
Vibration modes

In the **Filter Select** window one can open three **User Total** window.

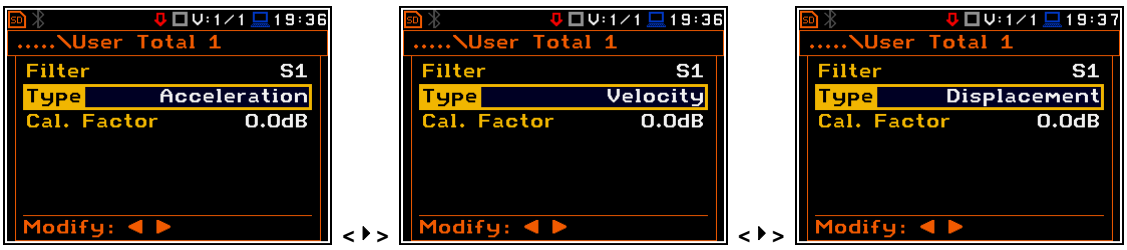


Spectrum Based Filter window; User Total window opening in Vibration modes

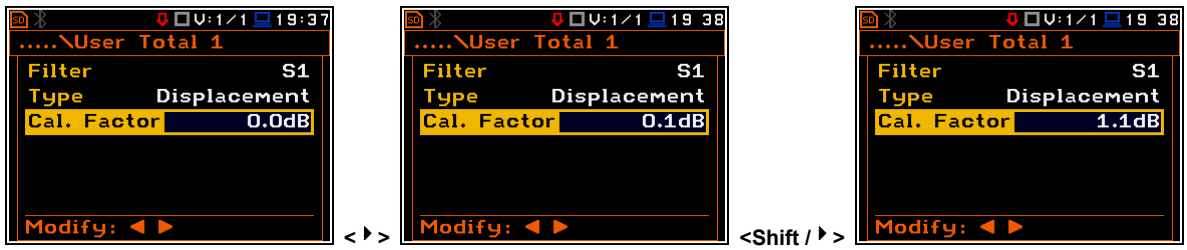
In the **User Total** window one can select one of three filters: **S1**, **S2** and **S3**, set the calibration factor and type of integration filter for measuring **Acceleration**, **Velocity** and **Displacement**.



User Total window in Vibration modes; Filter selection



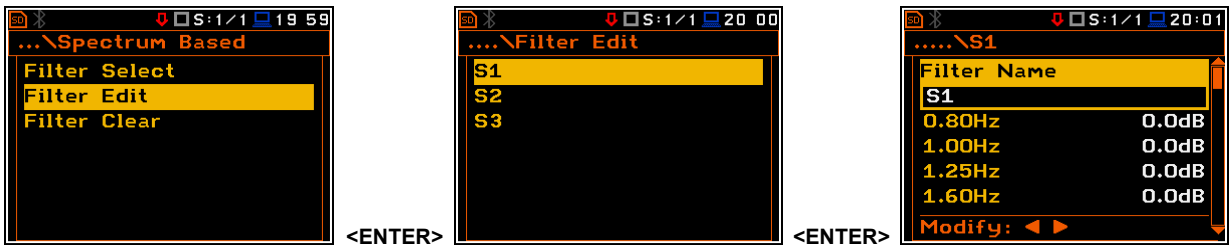
User Total window in Vibration modes; Type selection



User Total window in Vibration modes; Cal. Factor selection

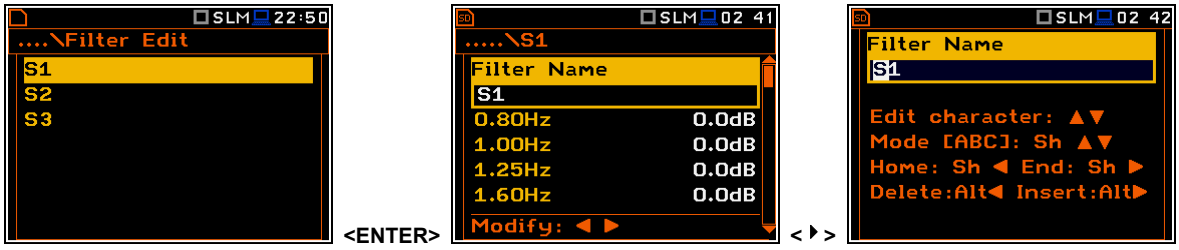
11.16.2. Setting the coefficients of the user filters set – Filter Edit

The **Filter Edit** sub-list enables the user to select which filters should be edited; the available options are as follows: **S1**, **S2**, **S3** or any other transmitted to the instrument from a PC by means of the interface.



Spectrum Based Filter window, the Filter Edit window opening

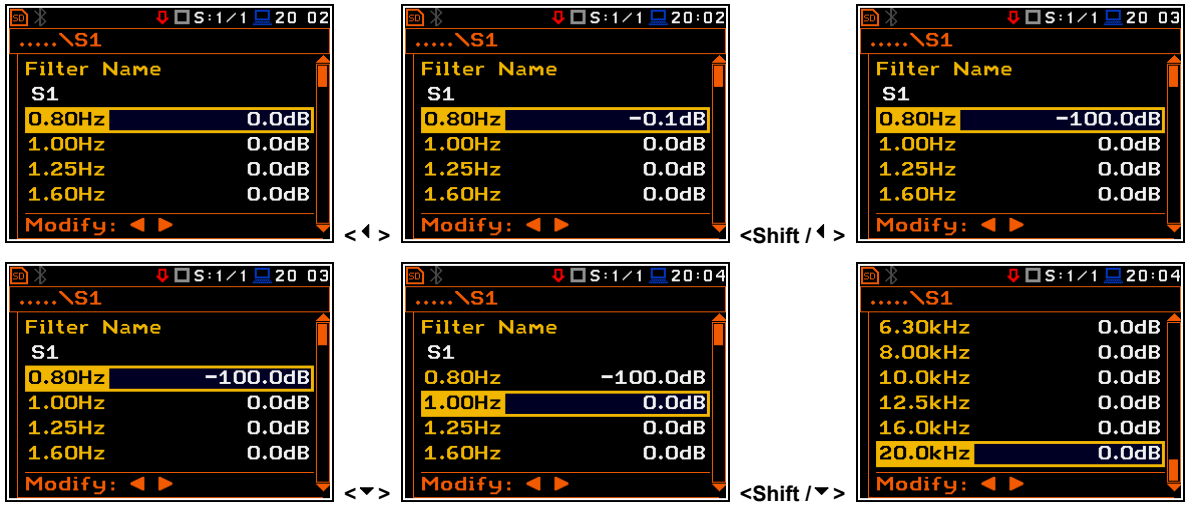
The filter name can be changed in the edition window, which is opening by means of the **< ◄ >**, **< ► >** push-buttons.



Filter Edit window, the filter selection

The opened window contains the centre frequencies of the filters and their coefficients:

- **0.80 Hz:** available values for 0.8 Hz centre frequency filter: **-100.0dB ... 100.0dB**
- **1.00 Hz:** available values for 1Hz centre frequency filter: **-100.0dB ... 100.0dB**
- **...**
- **20.0kHz:** available values for 20 kHz centre frequency filter: **-100.0dB ... 100.0dB**



S1 filter windows; the coefficients selection

12. FFT ANALYSER

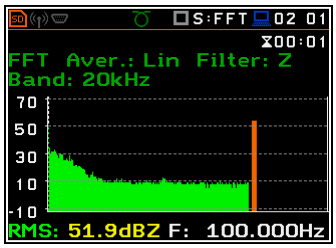
The instrument operates as **FFT** analyser in a very similar way to the **Level Meter** mode and, in addition, **FFT** analysis is performed in parallel with the **SLM** or **VLM** operations.

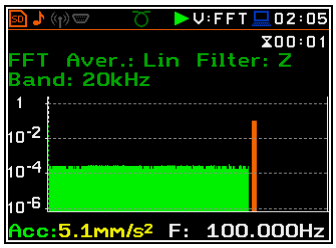
Notice: *The **Total** result is measured with the weighting filters (**A**, **C** or **Z** - in the case of sound measurements; **HP** – in the case of vibration measurements) without taking into account the settings of the level meters for profiles. The spectra are always linearly averaged. Thus, the **TOTAL** values from **FFT** analysis can be different from those obtained for the profiles (if the **RMS Integration** was set as **Exp**).*

The **SVAN 979** instrument operates in two ranges, called **Low** and **High**, which can be selected in the **Range** window *(path: <Menu> / Measurement / Range)*.

The results of **FFT** analysis (so-called spectrum) can be examined by the user on a display in **Spectrum** presentation mode. The availability of this mode can be switched on or off by the user (*path: <Menu> / Display / Display Modes*).

FFT spectrum together with the **Total** value measured with selected by the user weighting filters are presented in the switched on **Spectrum** mode. The read-out of the interested value of spectrum can be done in Sound modes and in Vibration modes of the presentation.

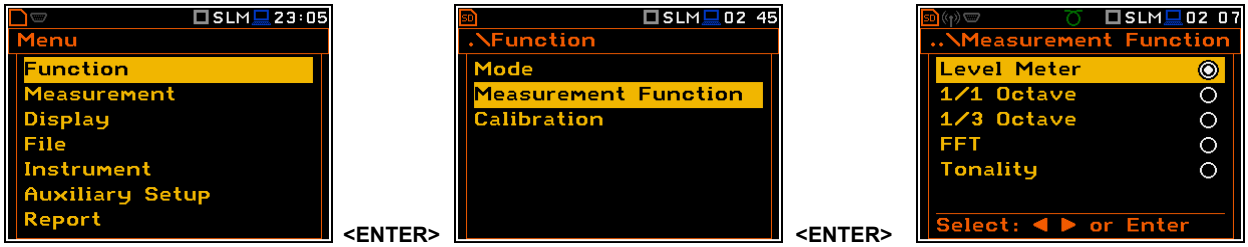
a) 

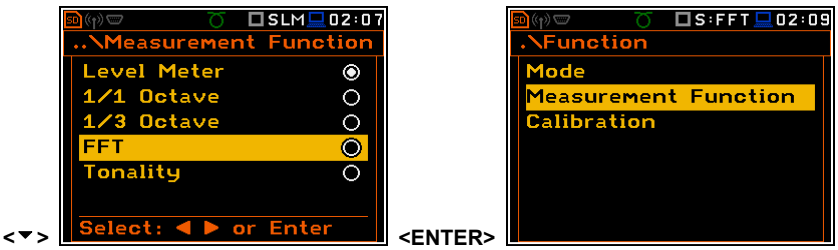
b) 

FFT analysis in Spectrum display mode in sound (a) and vibration (b) modes

12.1. Selection of FFT analysis mode

In order to select the **FFT** analysis mode the user has to enter the **Function** list by pressing the **<Menu>** push-button, then - select by means of the **<▲>** or **<▼>** push-buttons the **Function** text and press the **<ENTER>** one. Then, the user has to open the **Measurement Function** window (to select the **Measurement Function** text using the **<▲>**, **<▼>** push-buttons and press the **<ENTER>** one when this text is displayed inversely).





FFT analysis mode activation

***Notice**: It is not possible to change the current function during the measurements. The instrument displays in this case for about 2 seconds the text: **"Measurement in Progress"**. In order to change the current measurement function the instrument must be stopped!*

12.2. Selection of parameters of FFT analysis

The execution of **FFT** analysis depends on the certain number of the parameters, which can be set in the different windows of the **Measurement** list. Namely, the user can set there the range of the measurements (*path: Menu / Measurement / Range*) and set the weghting filter (**Filter**), frequency band (**Band**), weighting window (**Window**) and number of lines (**Lines**) in the FFT window (*path: <Menu> / Measurement / FFT*). Additionally, the user can switch on or off the registration of the spectra in the logger file (*path: <Menu> / Measurement / Logging / Logger Results*).

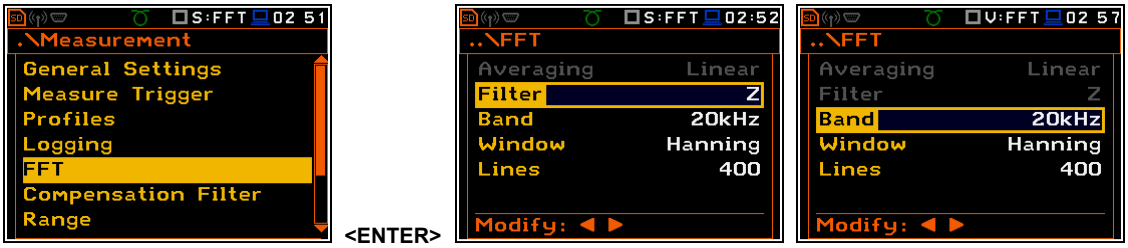
12.3. Measurement range selection in FFT analysis - Range

In **FFT** analyser mode the user can select the input ranges specified in Appendix C, named as **Low** and **High**. The selection of the input range is possible after entering the **Range** window of the **Measurement** list.

Range window in FFT analyser in Sound a) and Vibration b) modes

12.4. Setting the parameters of FFT analysis - FFT

In **FFT** mode a context element (**FFT**) on the **Measurement** list appears (*path: <Menu> / Measurement / FFT*).



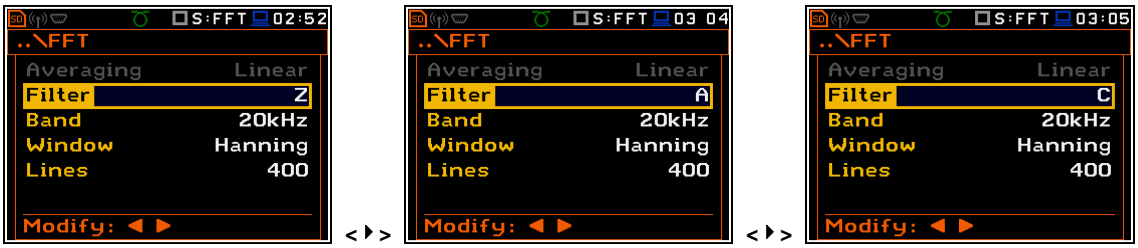
FFT window opening for Sound and Vibration modes

Using the **FFT** window one can select the weighting filter (**Filter**), the frequency band (**Band**), the weghting window (**Window**) and the number of lines (**Lines**) for the FFT analysis.

The following weighting filters are available for the **FFT** analysis of sound:

- **A** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **C** type 1 according to the IEC 651 and IEC 61672-1 standards,
- **B** type 1 according to the IEC 651 standard,
- **Z** type 1 according to the IEC 61672-1 standard
- **HP** type 1 according to the IEC 61672-1 standard

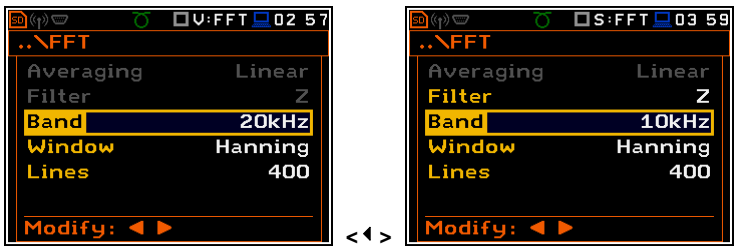
The only one weighting filter is available for the **FFT** analysis of vibration: **HP**



FFT window; the Filter selection in the Sound modes

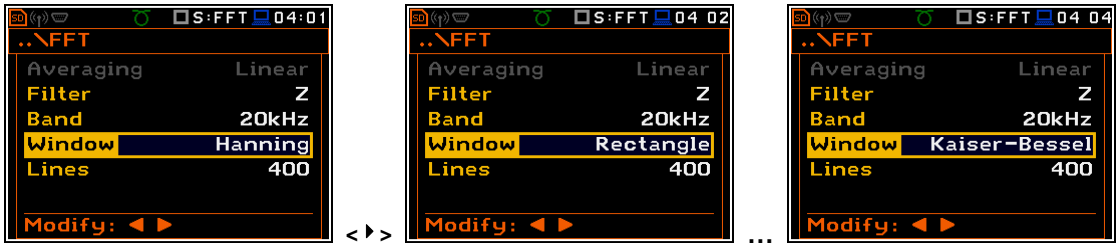
The characteristics of the filters are given in Appendix D.

In the **Band** position the user can select the band in which the **FFT** analysis of the signal has to be performed. The user can select: **20 kHz**, **10 kHz**, **5 kHz**, **2.5 kHz**, **1.25 kHz**, **625 Hz**, **312 Hz**, **156 Hz** и **78 Hz**.



FFT window; the Band selection

In the **Window** position the user can select the wieghting window for the **FFT** analysis of the signal. The user can select **Hanning**, **Rectangle**, **Flat Top**and **Kaiser-Bessel** weighting windows.



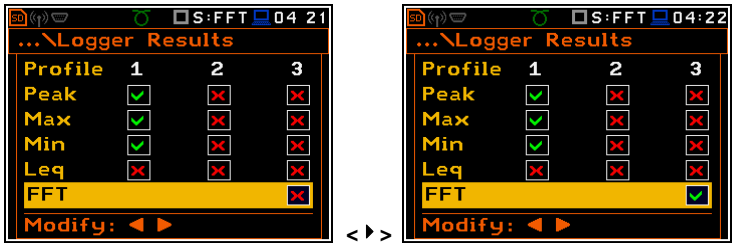
FFT window; the Window selection

In the **Lines** position the user can select the number of lines for the **FFT** analysis of the signal. The user can select **1600**, **800** and **400** lines.

FFT window; the lines number selection

12.5. Activation of saving of FFT analysis results in the logger's file - Logger Results

The **RMS** results from **FFT** analysis can be saved in the logger's file. The enabling of spectrum saving in the logger file is made by activation / deactivation the **Spectrum** position by means of the **< ▲ >**, **< ▼ >** push-buttons.



FFT windows with disabled and enabled savings of FFT spectrum

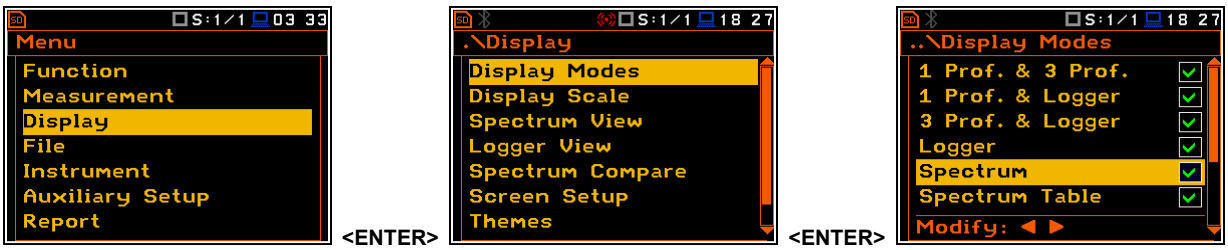
12.6. Display options in FFT analysis mode

The **Display** list is used for setting the various parameters, which are mainly dedicated for the control of the display. The following windows contain the elements that influence the presentation of the results of **FFT** analysis:

Display Modes enables one to select the mode of the presentation of **FFT** analysis;
Display Scale enables one to change the scale of the vertical and horizontal axis of the graphical presentation, switch on and off the grid, switch on or off grid and autoscale;
Spectrum View enables one to choose the type of the spectrum to be presented;
Logger View enables one to select and present the results of the analysis stored in the files of the logger.

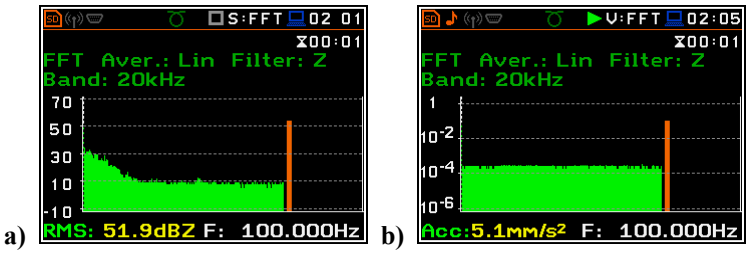
12.7. Presentation of FFT analysis results

The **Spectrum** positions of the **Display Modes** list are accessible for **FFT** function.



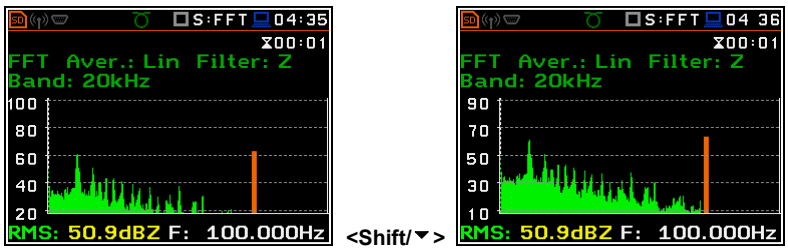
Display Modes window with available modes of presentation

When **Spectrum** mode is switched on the measurement screen in **Spectrum** visualisation mode is like below.



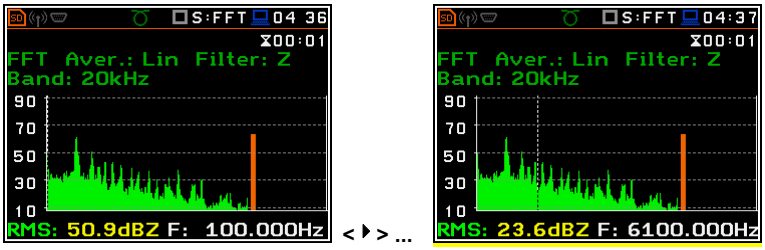
FFT analysis in Spectrum display mode in sound (a) and vibration (b) modes

The user may shift the Y-axis during the spectrum presentation after pressing the **<Shift>** and **<▲>** (or the **<Shift>** and **<▼>**) push-buttons.



FFT analysis with the shifted horizontal axis in relation to vertical one

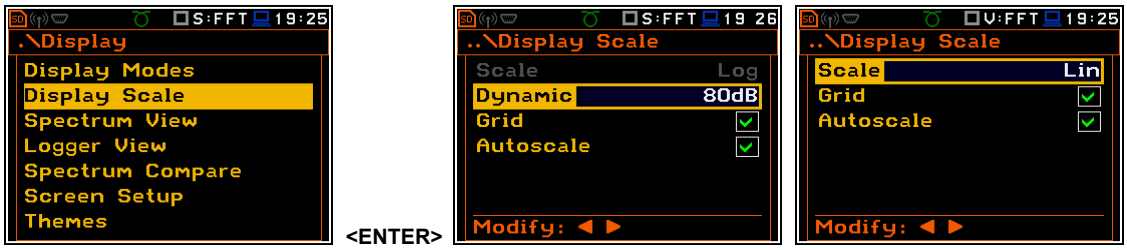
The user may change the cursor position by means of the **<◄>**, **<►>** push-buttons. The frequency and appropriate value are presented in the line below the plot.



Change the cursor position for the FFT spectrum

12.8. Setting the scale of the measurement results presentation - Scale

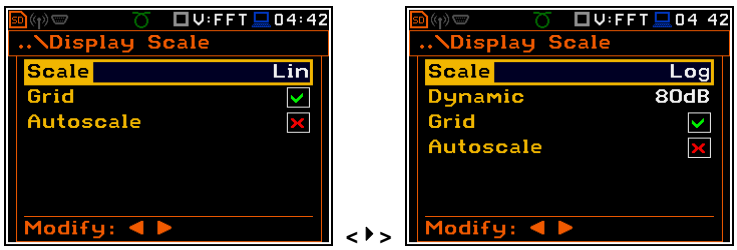
The **Display Scale** sub-list enables the user to change the scale in the available modes of graphical presentation of the measurement results and switch on/off the grid.



Display Scale windows in Sound and Vibration modes

Setting the scale of the measurement results presentation – **Scale**

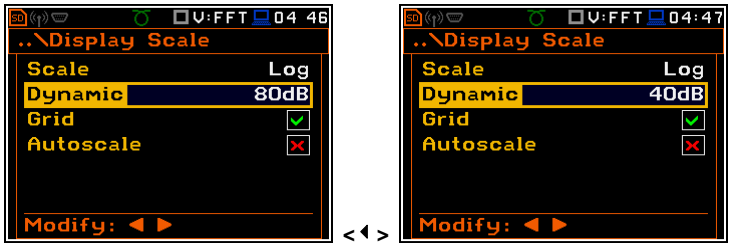
The **Scale** position is accessible only in the case of Vibration measurement modes. Two options are available: **Lin** (linear) and **Log** (logarithmic). In the case of the first one the graphical presentation and the units both are linear. In the latter case the graphical presentation is given in the logarithmic scale and the measurement results are expressed in decibels (the result is related to the values set in the **Reference Level** (*path: <Menu> / Auxiliary Setup / Reference Levels*). In the case of the sound measurements the **Scale** position is not active. All results are presented in the logarithmic scale.



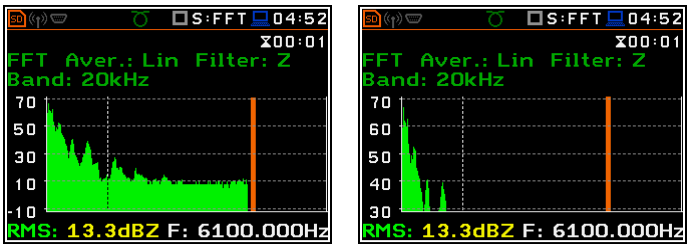
Display Scale window, scale selection in vibration modes

Scaling the vertical axis of the graphical mode presentation – **Dynamic**

The **Dynamic** position enables the user to select the proper scaling of the graphical mode presentation. In the case of the vertical axis one can obtain the double, four times and eight times expansion (as the default the vertical axis corresponds to 80 dB, after expansion it corresponds to 40 dB, 20 dB and 10 dB – respectively).



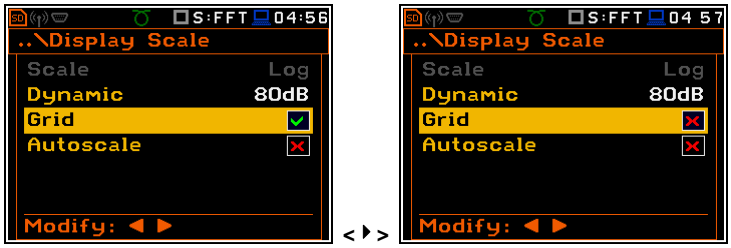
Dynamic parameter changing



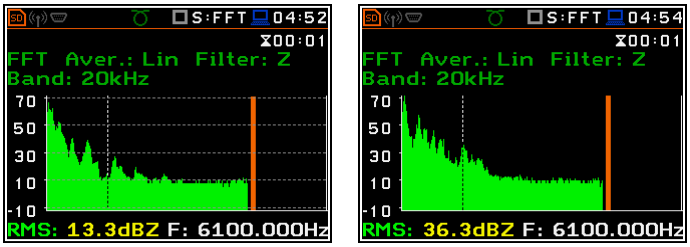
Displays with the FFT results presented with different Dynamic parameter (80 and 40 dB)

Switching on/off the grid in the graphical mode presentation – **Grid**

The **Grid** enables the user to switch on or off the grid in any graphical presentation.



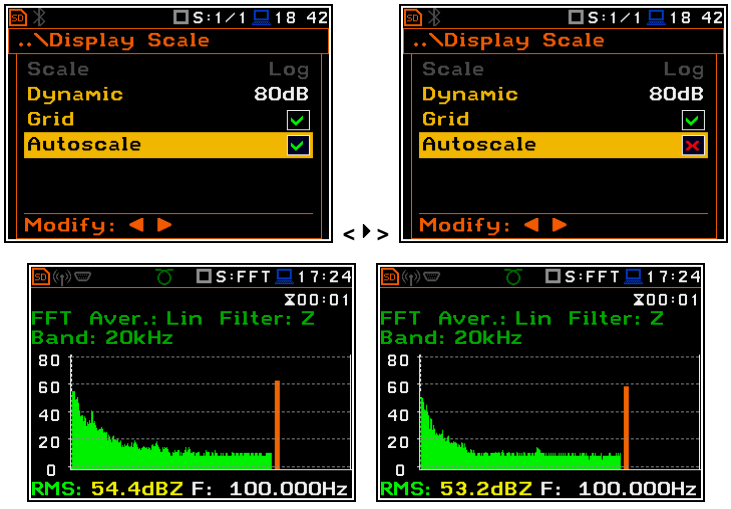
Grid option selection and switching it off



FFT spectrum presented with and without Grid

Switching on/off the automatic Y-scale adjustment – **Autoscale**

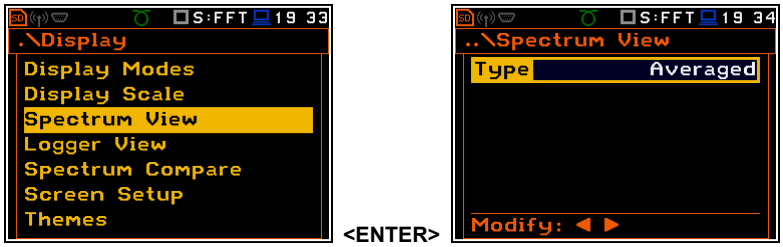
The **Autoscale** position switch on the automatic adjustment of scale Y.



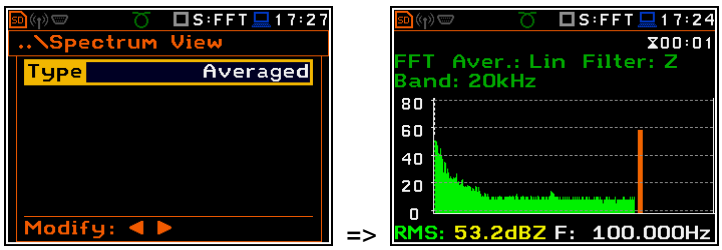
Displays with the grid switched on and off

12.9. Setting the parameters of the spectrum presentation - Spectrum View

In the **Spectrum View** window the only one spectrum types is available - **Averaged**.



Spectrum View window opening



Averaged FFT spectrum presentation